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## GOT A DIY QUESTION?

Finding answers is easy at [familyhandyman.com](http://familyhandyman.com). Just use the search box at the top of the page to get expert step-by-step help with your project. Or register on the site and join our DIY Forum, where you can ask questions or give advice.

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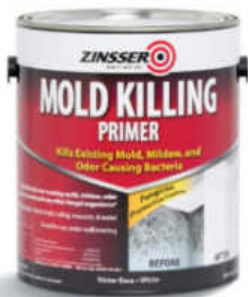
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# STUFF we love

BY MARK PETERSEN

editors@thefamilyhandyman.com



HUSQVARNA

## NEXT-GENERATION ROBOTIC MOWER

Battery-powered robotic mowers have been around for a while, but Husqvarna has a new one called the Automower. I recently had a chance to try it out and it worked great. The guide wire that runs around the perimeter of my yard was held down with stakes, so no trenching was necessary, and programming was simple. The whole setup took less than 90 minutes. After that, all I had to do was remember to look out the window once in a while so I could admire my mechanical groundskeeper hard at work.

The primary feature that makes this machine excel is the retractable, razor-like cutting blades. They're just a fraction of the size of thick steel blades, which results in clean cuts, longer run-times and super-quiet operation. I ran mine three times a week. My grass always seemed the same length and because the clippings were so small, they readily broke down into fertilizer. My grass actually looked healthier than it ever had.

The mower worked, rain or shine, for the few months I used it, even on the

hills. And because of the random cutting pattern, it left no tracks around trees or against the fence. My son was extremely disappointed when we sent back the mower after the trial (mowing is his job).

At [husqvarna.com](http://husqvarna.com), you can check out the cool video and find a dealer near you. The Husqvarna Automower costs \$2,000 to \$4,000 depending on mowing capacity and bells and whistles. That's a little pricey, but lawn services aren't cheap either, and bragging rights... priceless.

**Mark Petersen, Associate Editor**



# THE FAMILY Handyman

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
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## Burn, baby, burn

Declare war on weeds with the help of this BernzOmatic Lawn and Garden Torch Head. It's easy to use—just hook up a bottle of propane, click the piezo igniter and start incinerating.

It's perfect for weeds in sidewalk cracks, landscaping rock and patio pavers. It's not as fast as pulling or spraying, but it's a lot more fun: There's something fiendishly satisfying about watching those invaders die right before your very eyes.

Pick up the BernzOmatic Lawn and Garden Torch Head at Lowe's for \$40. It also works well for edging and for starting campfires.



BERNZOMATIC (X2)



## PRO TOOL & GEAR

### Better than a broom

Construction projects create an abundance of all sorts of filth: sawdust, insulation fibers, drywall dust, shingle grit, dirt. It's everywhere. Sure, you'll always have to keep a broom and dustpan in your truck, but consider adding a blower to your cleaning arsenal. It's great for clearing floors during rough framing, blowing shingle grit or slippery sawdust off a roof, cleaning up that miter saw before packing up, blowing out the inside of your work truck... you could even use it to dust yourself off before heading home for the day.

If you're already running the Milwaukee's M18 battery platform, check out the new M18 Compact Blower. It has three speed settings, a max airflow of 100 cfm and air speeds up to 160 mph! The bare tool costs \$79 at The Home Depot. Add \$130 if you need to buy a battery and charger.

### Pole saw attachment

Last year I bought a 40-volt Ryobi string trimmer. It worked so well that when my gas-powered pole saw died, I decided to ditch the gas and go cordless. I figured I'd stick with Ryobi but was disappointed when I didn't see a 40-volt model at The Home Depot. But then a pole saw attachment without a power head caught my eye. It turns out that I had unknowingly bought a stringer trimmer that was part of the Expand-It line, which works with all sorts of different attachments, including a pole saw.

I bought the Ryobi Pole Saw Attachment and abused it all afternoon with excellent results. The best part was that it cost about half as much as one of similar quality that required a power head and battery—sometimes it's better to be lucky. It cost \$99 (my string trimmer and power head cost \$169). Other Expand-It attachments include a hedge trimmer, brush cutter, edger and more.



Mark Petersen, Associate Editor





## DIY WORK WEAR

### I don't need no stinking tool belt

In my years as a remodeler, I never learned to love tool belts. I was thrilled when I discovered BLÅKLÄDER work pants. They have pouches and loops for tools, screws or whatever. I also love the pockets over the knees, which hold foam pads.

BLÅKLÄDER, a Swedish company, has been making work wear for 50 years and is just now starting to catch on here in North America. It makes pants from tough to nearly indestructible, as well as shirts, hats, vests, jackets and even a work kilt! The clothing is available online and at some stores. Check out the store finder at [blaklader.com](http://blaklader.com). The X1600 pants shown here cost about \$100.

**Chris Lange, Field Editor**



### Electronic fuel-injected lawn tractor engines

Why should you love a lawn tractor with an EFI engine? Let us count the ways: Fuel injection means no more finicky choking or gummed-up carburetors. And according to the manufacturer, there's no need to drain the gas tanks at the end of the season or add fuel stabilizers. Plus, you'll use less gas and need fewer oil changes. What's not to love? Cub Cadet is the first to hit the market with EFI-equipped non-commercial mowers. Look for them on various models in 2016.



### Bug-free playhouse

My garage is my playhouse, and I got sick of the bugs, bees, birds and blowing leaves finding their way in.

Last year, at a home show, I ran into Jim Ward, owner of Snap On Garage Screens. He sells giant screens made to fit garage door openings. I bought one and then installed it in less than an hour.

There's a pocket at the bottom to receive 1/2-in. PVC pipe (not included) to keep the screen from blowing around, and there's a zipper down the middle for easy access. To open it completely, just roll it up and strap it. I paid \$200 for one to fit my 8 x 18-ft. door. It was the best improvement at my place in a long time. Check out the screens at [snapongaragescreen.com](http://snapongaragescreen.com).

**Rune Eriksen, Field Editor**





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## Geared lopper

I'm the designated lopper in my family. Trimming down the garden, pruning trees and cutting down weed trees at the cabin, I give my loppers a workout. My latest lopper of choice is the new PowerGear2 from Fiskars. It has a gear system in the hinge that takes a lot of the effort out of cutting. According to Fiskars, the loppers are three times more powerful than ordinary loppers. For me, that means working faster, because I can use them for hardwood branches that formerly required a saw.

The handles do have to be opened wider than on my old loppers (because of the gears), which makes them a little more difficult to get into tight spaces, but for someone with limited arm strength, these Fiskars loppers would be great. They come in three sizes—18 in., 25 in. and 32 in.—at prices from \$25 to \$49. They're available at many large retailers.

**Ken Collier, Editor at Large**



## Collapsible wagon

Wagons work great for hauling planters and gardening tools around the yard, and coolers and lawn chairs at a summer festival. The problem is that a wagon takes up a lot of room in the garage and is almost impossible to fit into a car.

Mac Sports makes a wagon that folds up so it can be stored on a wall hook in the garage, and it fits easily in a car trunk. This wagon isn't as sturdy as the steel one you had as a kid, but it weighs less than 30 lbs. and can handle up to 150 lbs. of stuff. Buy one at Dick's Sporting Goods or at many other online retailers for \$70 to \$100.





## Rake leaves faster

My son and I recently spent an afternoon (much to his chagrin) out in the yard raking leaves. We took turns using my old rake and Ames's new dual-tine rake. Ames claims its new rake does the job 45 percent faster. I didn't conduct a scientific test, but there was no doubt it was faster.

The dual tines seemed to excel at cleaning a path with one swipe so I didn't have to go over the same area several times. And the handle was a little thicker and softer, which made it much more comfortable to use. Before long, there was more than a little grumbling about which of us would have to use my old rake. The Ames dual-tine rake combo comes with a detachable hand rake that is great for tight spaces and for scooping leaves into bags. Buy one at a hardware store or The Home Depot for \$25.

**Travis Larson, Senior Editor**



BRIGGS & STRATTON

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Are you a slacker when it comes to maintaining your small gas engines? Then Briggs & Stratton has just the product for you. The new EXi series engines don't require oil changes ... ever!

You'll still have to add a little oil occasionally, but no more messy slicks on your garage floor, and no more trips around town trying to dispose of used oil. Briggs & Stratton has achieved this engineering milestone with tighter seals and cooler running temperatures. Sure, you'll still have to change air filters and spark plugs, but that's easy. The new EXi engines can be found powering most popular brands of mowers.

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# CORDLESS YARD TOOLS

Do they make the cut?

by Rick Muscoplat  
editors@thefamilyhandyman.com

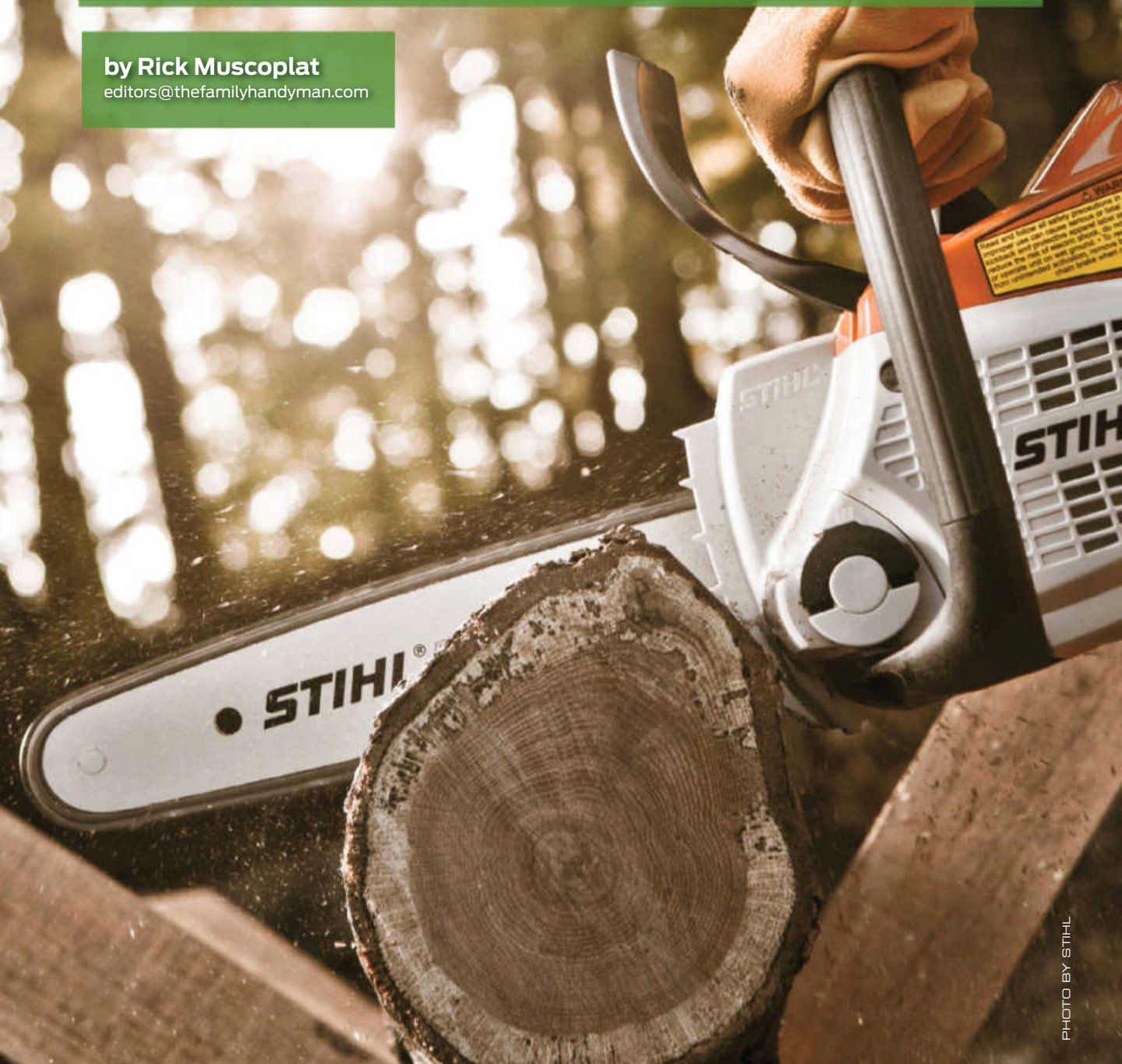


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**C**ordless yard tools have always been far more convenient than corded or gas models. But early models didn't always deliver on performance. Some weren't powerful enough to cut heavy growth, and many times the batteries ran out of power before the job was done.

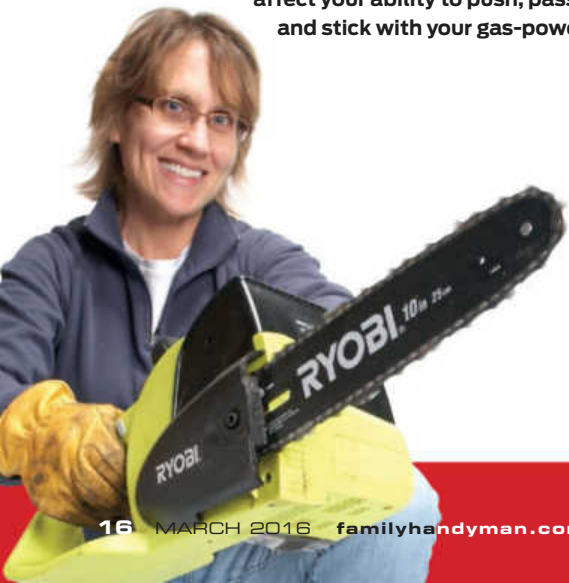
That's changing. The latest generation of 40-, 58- and even 80-volt lithium batteries is more powerful and runs longer. The tools are more robust, too, so they can do the work of gas-powered tools. If you were disappointed by lower-voltage tools in the past, it may be time to consider today's higher-voltage models. And even if you love your old 18-volt model (we know millions of you do!), read on to find out what more power could do for you.

## CAN THEY REPLACE GAS AND CORDED ELECTRIC MODELS?



**Lawn mower** (\$275 to \$800). Walk-behind cordless lawn mowers can directly replace a gas mower for use on many urban or suburban lawns. They're also great for touching up small areas on rural lots where lawn tractors are simply too big to get the job done.

Cordless mowers are lighter than gas-powered units, so they're easier to push and maneuver. But if you have a large lot or steep hills or physical limitations that affect your ability to push, pass on the cordless walk-behind mower and stick with your gas-powered, self-propelled machine.



**Chain saw** (\$200 to \$550). Cordless electric chain saws are great for occasional use to fell a tree or trim some limbs. But the battery won't last long enough to cut multiple trees or to turn an entire tree into firewood. For that work, you still need a gas chain saw.

## CAN THEY HANDLE YOUR YARD?

Cordless yard tools with voltage ratings of 40 or more are definitely powerful enough for most jobs. But there's no getting around the fact that battery run-time is still the limiting factor. When you're deciding whether a cordless electric yard tool could replace your gas or corded electric tool, consider two things:

### 1. How much run-time do you need?

Time how long it takes you to do the job with your current machine. Then shop for a tool that has sufficient run-time. If you need more run-time, you can always buy a second battery (\$140 to \$210, depending on the voltage and brand). Or you can take a break and let the battery recharge (sometimes in as few as 30 minutes).

### 2. Does your yard get out of control?

Be honest about how often you let your yard get out of hand. If you try to cut very long grass or heavy growth, a cordless tool may not have the run-time or raw power to get the job done.

With those caveats in mind, here's our advice based on frank discussions with the tool manufacturers, coupled with editors' actual experiences.



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## Tips for maximum battery life and value

- **Buy batteries cheaper.** Wait for a sale. Home centers and hardware stores typically put cordless electric tools and replacement batteries on sale for Father's Day, Black Friday and Christmas. Sometimes the cheapest way to buy an additional battery is to buy a battery/tool combo on sale.
- **Store and charge the battery indoors.** High heat (in your garage or car) and freezing temperatures dramatically reduce the life of the battery. And, charging the battery in high heat conditions or in direct sunlight also greatly reduces battery life and increases charging time.
- **Follow the manufacturer's instructions regarding charging.** Some want you to store the battery on a powered charger when it's not in use. Others specifically state that you must remove the battery from the charger as soon as it's charged.
- **Keep your receipt.** You'll need it to get warranty coverage on your battery or yard tool. Since most receipts are printed on heat-sensitive paper that fades over time, make a photocopy of the original receipt and tape the duplicate to the charger so you'll have it if you need warranty repairs.



## CAN THEY REPLACE GAS AND CORDED ELECTRIC MODELS?



### Leaf blower (\$150 to \$300).

Cordless leaf blowers are great for quick driveway, sidewalk or patio cleanup after mowing. They're so much more convenient than gas or electric models. You'd be surprised at how often you'd use it to clean the garage, shed, deck and shop, as well as outdoor furniture.

However, to move large piles of leaves, you'd have to run the blower at full power, and that would reduce run-time to about 20 minutes. If it takes longer than that to round up your leaves, either buy a second battery or keep your gas or corded electric model for the big cleanup. Use a cordless blower for quick, easy jobs.



### String trimmer (\$120 to \$300).

For most urban or suburban yards, a cordless electric string trimmer (40 volts or higher) can easily replace a gas or corded electric trimmer. It can handle occasional patches of heavy growth, but if you regularly let your lawn grow too long or have a large rural lot, you'll need an additional battery.

### Hedge trimmer (\$150 to \$300).

Cordless electric hedge trimmers are a perfect replacement for corded electric trimmers. They can handle heavy cuts, and the battery lasts long enough to handle most yards.





## BUYING TIPS

### Start at the store

Visit a home center, garden center, hardware store or dealer and get recommendations based on your lot size and configuration. Pick up the machines and compare the weight and balance (with the battery in place). Then check out other brands at other stores and online.

### Compare run-times, but beware ...

Some tools have adjustable power settings. And as you'd expect, the battery's run-time depends on the setting. So when you compare the run-times given by manufacturers, make sure you know which power setting they used.

Some manufacturers list two run-times based on high and low settings. Other manufacturers list a single run-time, and it's often based on the low power setting. If you don't know which power setting the manufacturer used, you might be disappointed. A battery with a one-hour run-time at low power, for example, can run out of juice in as few as 15 minutes at high power. If the manufacturer doesn't list both in the specs, call its toll-free number and ask.



VOLTAGE:	58V
BATTERY:	2 AMP HOUR LI-ION
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RUN TIME (LOW):	UP TO 1 HOUR
RUN TIME (HIGH):	UP TO 15 MINUTES
MOTOR:	BRUSHLESS
CFM:	MAX 450
MPH:	MAX 120
WEIGHT:	11.0 LBS

SPECIFICATIONS / SPÉCIFICATIONS

### Don't get hooked on battery specs

Remember that battery voltage and amp-hour ratings tell you about the battery only; they aren't necessarily good indicators of the tool's power or run-time. For example, here's what we found when we compared two cordless electric leaf blowers: The higher-voltage model and the lower-voltage tool had nearly identical cfm and air velocity ratings. But the high-voltage tool was much heavier and had a shorter battery warranty and higher battery replacement cost. So it's smart to compare models based on all the factors: initial cost; performance specs like run-time; battery and tool warranty; replacement battery costs; and weight and balance.

### Compare return policies

Some retail stores offer a 90-day return policy, while online stores usually limit returns to just 30 days. You'll also likely have to pay the return shipping costs and a restocking fee if the unit isn't defective.

### Read customer reviews

Don't rely solely on manufacturers' specs. Read customer reviews (the good and the bad) to get a feel for how well the tool actually performs. But keep in mind that many users have unrealistic expectations for run-time, leading them to downgrade a tool's performance. If the battery is rated for 30 minutes and the reviewer expected it to last 45 minutes, that's not a manufacturing defect.

### Follow the manufacturer's start-up charging procedures

Most new batteries require at least a 12-hour charge before use. Some even require three to five charge cycles before the battery reaches full operation. If you fudge on the manufacturer's charging instructions, you'll be disappointed in the run-time. However, if you've followed the instructions to the letter and you're not happy with the tool's performance, return it right away.



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# GAS-POWERED LEAF BLOWERS

**The best models  
offer more than just  
great specs**

**by Rick Muscoplat**  
[editors@thefamilyhandyman.com](mailto:editors@thefamilyhandyman.com)

Gas-powered leaf blowers save a lot of time on fall cleanup. They're great for small jobs too, like blowing debris off your driveway or out of your garage.

However, choosing a gas leaf blower isn't as easy as using one. You'll find lots of makes and models and enough air movement specs to fill a spreadsheet. We corralled models from major brands and handed them out to our editors to test during peak leaf-blowing season. Based on our research and field use, we came up with some solid buying advice and our picks for Editors' Choice awards. If you're thinking about buying a leaf blower, this is your guide.



## IS A GAS MODEL FOR YOU?

Each of the three types of leaf blowers has pros and cons:

**Corded electric models** are inexpensive (\$30 to \$120) and work well, but the cord is a hassle and limits you to 100 ft. from the outlet. Still, if you have a small yard and don't use a blower often, you can't beat the low cost and zero maintenance of an electric unit.

**Cordless models** cost from \$120 to \$300 and are by far the most convenient choice because you never have to deal with extension cords or gasoline. Some are powerful enough to move lots of leaves from a small yard, but the battery's run-time may not be long enough for a large yard. For more on cordless yard tools, see p. 14.

**Gas models** aren't limited by run-time or cord length. They can run all day as long as you refill the tank. Plus, they're available in more styles and power ranges. Prices start at about \$100 and top out at \$550. Next to corded blowers, gas-powered machines have the lowest overall cost. That's why we chose them for this story.

### How long will it last?

With a little care, you can expect to get about 1,000 hours of use before your gas blower needs repairs. For a typical homeowner, that's about 10 years. The key to years of trouble-free operation is to always use a fresh gas/two-cycle oil mixture and follow the manufacturer's recommendations for changing the air filter and replacing the spark plug.

## CHOOSE THE STYLE TO FIT YOUR YARD



### Handheld units for urban and suburban yards

Handheld blowers are the most economical and work best for most average urban and suburban lots. Prices range from as little as \$99 to \$240. Most weigh about 9 lbs. Handheld blowers are the easiest to set up, use and store.



### Combination blower/vacuum for mulching

A blower/vacuum can blow leaves into a pile and then shred and pack them into a shoulder bag. The reduction ratio is the number of bags of dry leaves per bag of compacted leaves. The ratios vary from 10:1 to 16:1. Some of the handheld blowers we show here can be converted into blower/vacuum models with a conversion kit (usually about \$45).



### Backpacks for large lots

Backpacks are a better choice for herding leaves on large, heavily treed lots, or if you simply can't handle the weight of a handheld unit for long cleanups. All backpacks come with a right-hand blower tube. If you're a lefty and can't operate the throttle with your right hand, choose either the hip-mounted design or a unit with "cruise control."

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## Cfm and mph ratings matter, but...

Air velocity (measured in miles per hour) is what gets leaves moving. Air volume (measured in cubic feet per minute) keeps the leaf piles moving over a large area. In general, blowers with higher cfm and mph ratings perform better than units with lower numbers, but not always. A well-designed blow tube can more than make up for the difference in specs. The Echo PB-255LN, for example, has the lowest cfm-to-mph ratio of all the machines, yet it outperformed other handheld units with higher air movement ratings.

Manufacturers list engine size in cubic centimeters (cc). More cc usually means more power, but the cfm and mph ratings are better guides to overall performance.

## Features to look for

**VIBRATION REDUCTION.** Vibration increases fatigue and causes hand and finger numbness and tingling. The better units mount the engine on springs and add vibration-dampening to the handle and extra padding to the backpack. Look for those anti-vibration components.

**ROTATIONAL CONTROL.** The spinning impeller and air speed create a “gyro” effect that rotates the machine off center, so you have to constantly steer it back. That leads to arm fatigue. The better machines cancel out the gyro effect and refer to this feature as “rotational control.”

**QUICK STORAGE.** Some models have a quick-disconnect tube so you can store the unit in less space. On backpack models, look for a

tie-down strap to secure the blow tube to the frame.

**WARRANTY.** Echo, Ryobi and Hitachi offer a longer manufacturer warranty right out of the box. But Stihl and Husqvarna extend the warranty if you buy and use their two-cycle oil or canned premixed gas.

## Shop locally and check online reviews

Check out several brands at different small-engine repair shops/dealers and home centers. If they have demo models, fire up a few and compare the feel and comfort. Narrow your choices and then check online customer reviews to spot consistent negative comments.

## Read the store's return policy

Many local and online stores allow you to return an unused leaf blower. But some won't allow returns once you've added fuel.

## Buying online is a commitment

Buying online might save money, but only if you're happy with the purchase. If you change your mind and want to return the blower, prepare to dig deep because return-shipping can cost \$30 to \$50 depending on the model.

## Know your local ordinances

Many homeowners' associations and city ordinances limit leaf blower use to certain times and decibel levels. Check local regulations before you buy a gas, corded or cordless blower.

## Avoid start-up problems

If you buy just enough gas to last for a month and mix it with fuel stabilizer and two-cycle oil, a gas blower will start up just fine. Or, you can eliminate the stale gas problem entirely by buying premixed canned non-ethanol fuel (doing this extends the factory warranty on some brands).



## Buy for your dominant hand

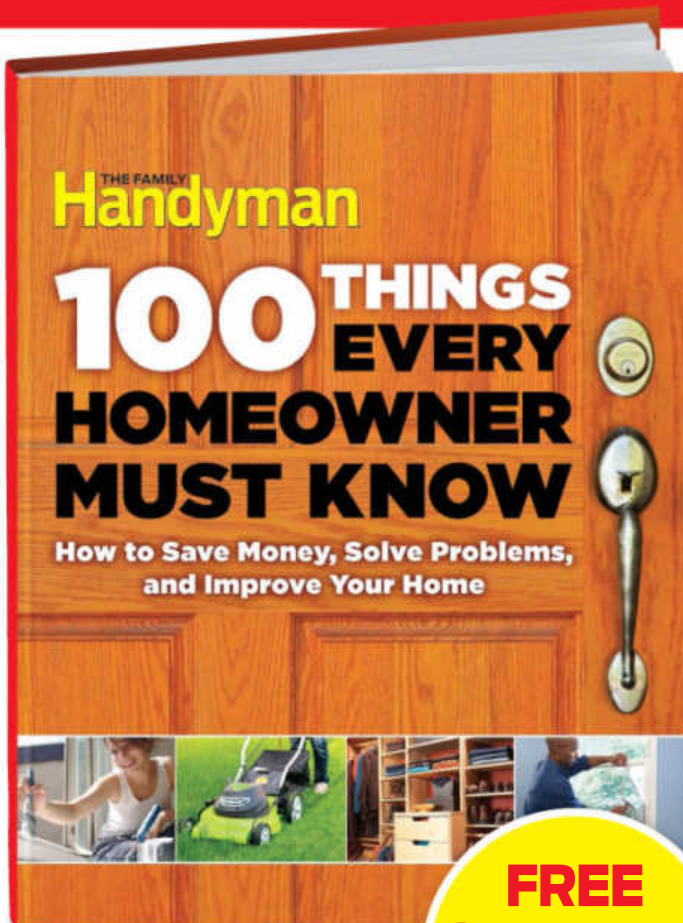
All handhelds can be used with either hand, but the air intake tends to suck your pants into the screen. To avoid that problem, choose a model with the intake located opposite your dominant hand.

## Tips for operating a blower/vacuum

■ Twigs, garden mulch and landscape rocks can damage the impeller, so scout your yard and remove those objects before using the vacuum feature.

■ Wear a dust respirator when shredding dry leaves and emptying the shoulder bag—shredding kicks up a lot of dust.

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## STIHL BG 86 \$240

9.7 lbs. | 459 cfm | 154 mph | Right-side intake, left-side starter pull | 2-year warranty

The BG 86 shares our Best Overall award with the Echo below. This model costs a bit more and has a shorter warranty, but it's a standout for power, vibration reduction and comfort. The primer bulb is designed to prevent flooding if you press it too many times. The washable air filter eliminates the cost of replacement filters.



## STIHL BG 56 C-E \$170

9.3 lbs. | 418 cfm | 134 mph | Right-side intake, left-side starter pull | 2-year warranty

This is the lightest blower of the bunch, but it's powerful enough to do the job. It also has an innovative starter mechanism and a semiautomatic choke. Instead of a powerful jerking motion to get it going, it starts up with just one long, easy pull.



## ECHO PB-255LN \$200

10.2 lbs. | 354 cfm | 191 mph | Left-side intake, right-side starter pull | 5-year warranty

Like its cowlinner of our Best Overall award, this machine is a top performer. Despite its lower cfm and mph specs, it outperformed other models with higher air ratings. Plus, it incorporates a very effective rotational control design that keeps it pointed where you want it. The three-position handle is comfortable. Echo backs it up with an excellent warranty.



## TROY-BILT TB430 \$100

12.2 lbs. | 430 cfm | 200 mph | Left-side intake, rear starter pull | 2-year warranty

This Troy-Bilt model is the heaviest of all the handhelds, but priced right and powerful enough to handle most yards.



## TROY-BILT TB2MB Jet \$150

11.58 lbs. | 650 cfm | 130 mph | Front intake, rear starter pull | 2-year warranty

The entirely new design features a front-mounted impeller that sucks in air from the front to eliminate the gyro effect. It has a very high cfm rating, but we think a higher mph rating would make it a more effective blower.



## HITACHI RB24EAP \$129

8.6 lbs. | 441 cfm | 170 mph | Left-side intake, right-side starter pull | 7-year warranty

The Hitachi is an economical no-frills unit with the best warranty in the group. It's powerful and lightweight, but you'll feel the vibration, so wear leather gloves when using it.



## HUSQVARNA 125B \$150

9.4 lbs. | 425 cfm | 170 mph | Left-side intake, left-side starter pull | 2-year warranty

This powerful machine has very good rotational control. Husqvarna paid attention to the details with intuitive controls, even down to the Off switch that resets itself to the On position so it starts back up as soon as you pull the cord. The blow tube length is adjustable so you can set it for comfort. This Husqvarna is a new model and may not be available at all stores.

## BLOWER/VACUUM MODELS



**Best Overall**

### ECHO ES-250 Shred 'N' Vac \$230

10 lbs. | 391 cfm | 165 mph | Left-side intake, right-side starter pull | 5-year warranty  
Great performance with very good vibration and gyro control. This blower/vac is the easiest to convert to vacuum mode and has a 12:1 reduction ratio. Best warranty of all the blower/vacs.



**Best Value**

### RYOBI RY09056 \$100

9.5 lbs. | 400 cfm | 150 mph | Left-side intake, rear starter pull | 3-year warranty  
Powerful blower with good vibration and rotational control. Works well in vacuum mode, but switching to vacuum mode requires a star bit wrench and a flat-blade screwdriver (the Echo blower/vac switch-over doesn't require any tools). The reduction ratio is 12:1.



### SEARS 41AS2BVG799 \$195

13 lbs. | 450 cfm | 150 mph | Right-side intake, left-side starter pull | 2-year warranty  
Good power, but a bit heavy and has some rotational force. The spring assist makes starting easier. Sears offers an optional electric starter and a special bit that allows you to spin the engine with your drill. The reduction ratio is 10:1. Converting to vacuum mode requires a screwdriver.



### REMINGTON RM2BV \$150

12.6 lbs. | 450 cfm | 205 mph | Right-side intake, left-side starter pull | 2-year warranty  
Good power, but slightly heavier than others. The blower includes a reduced-effort starting mechanism. The handle has a "cruise control" throttle lock so you don't have to keep your finger on the trigger. The vacuum/mulching feature reduces 16 bags of dry leaves to one bag.

## BACKPACK MODELS

### SEARS 41DRBEG799 \$235

13.5 lbs. | 445 cfm | 145 mph | 2-year warranty  
Lightest backpack that's powerful enough to do the job. Unique mesh back panel to eliminate vibration on your middle back. We'd like to see a bit more padding at the top and bottom, though.

### STIHL 450C-EF \$550

25.4 lbs. | 642 cfm | 186 mph | 2-year warranty  
Pricy, but it's the cream of the crop. Powerful, comfortable, extendable blow tube. An excellent machine.

### ECHO PB-755ST \$439

24.7 lbs. | 651 cfm | 233 mph | 5-year warranty  
A solid, powerful, comfortable machine that gets the job done. Best warranty of all the backpacks.

### RYOBI BP42 \$200

18 lbs. | 510 cfm | 185 mph | 3-year warranty  
Easy to start, comfortable and economical. It's powerful enough for larger yards.

### HUSQVARNA 560BTS \$440

23.2 lbs. | 631 cfm | 232 mph | 2-year warranty  
Very powerful and lots of back padding. It's a great alternative to the Stihl if you want to save some money.



**Best Overall**



**Best Value**



### Leaf blower safety tips

- Wear leather gloves to decrease vibration-induced hand and finger numbness and tingling.
- Wear hearing protection. Newer leaf blowers are usually rated below 75 decibels, but that's based on the noise level 50 ft. away from the machine. The noise level right at the machine can easily approach 100 decibels—high enough to cause permanent hearing loss.
- Wear eye protection. Leaf blowers kick up dust, dirt and rocks.
- Let the machine cool for 15 minutes before refueling. Heat from a hot engine can ignite gas vapors as you fill the tank.



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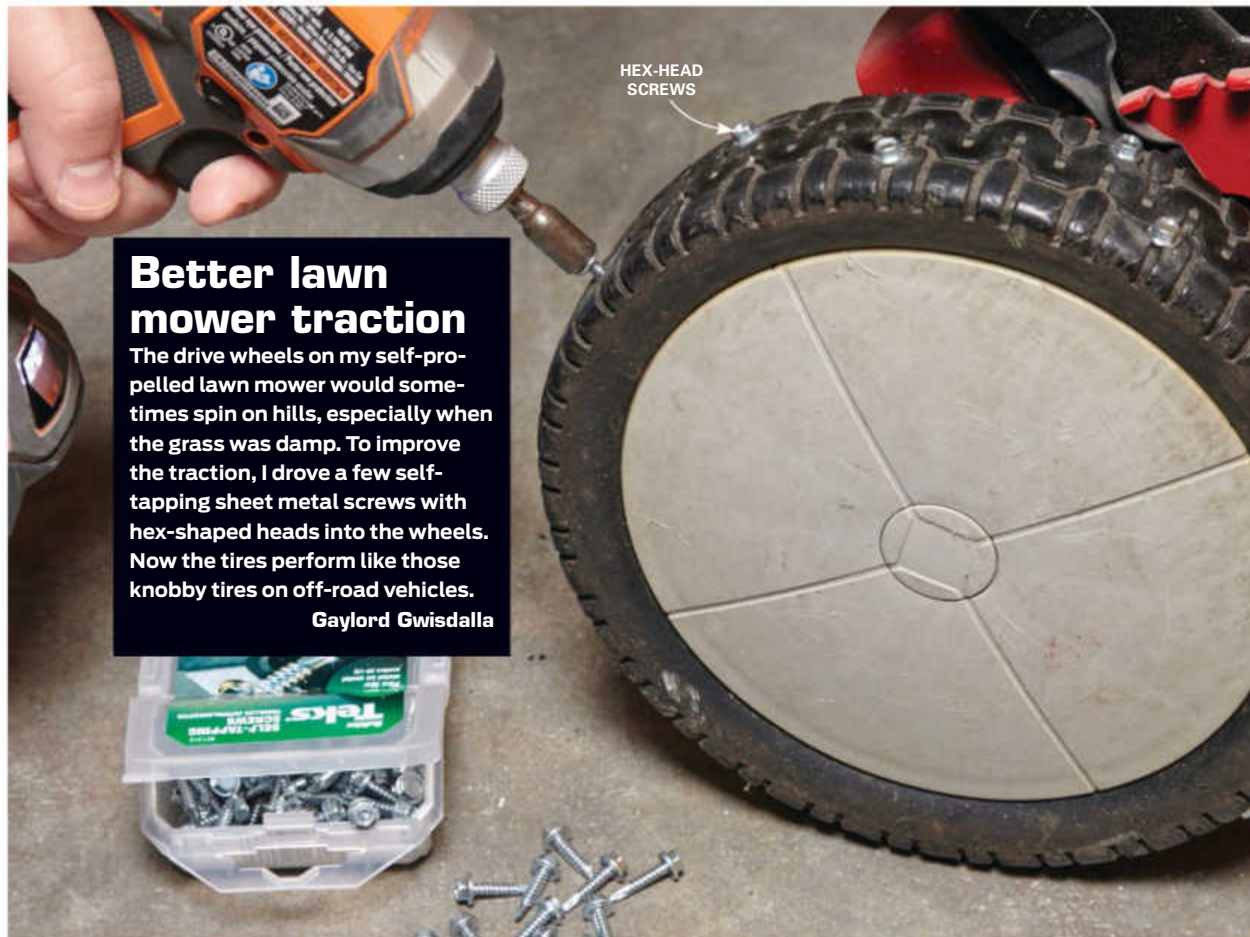
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FROM OUR READERS

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## Better lawn mower traction

The drive wheels on my self-propelled lawn mower would sometimes spin on hills, especially when the grass was damp. To improve the traction, I drove a few self-tapping sheet metal screws with hex-shaped heads into the wheels. Now the tires perform like those knobby tires on off-road vehicles.

Gaylord Gwisdalla

EDITOR JASON WHITE • ART DIRECTION MARCIA ROEPKE • PHOTOGRAPHY TOM FENENGA



## Fixing a screwy electrical box

I recently had to deal with a loose receptacle inside a plastic electrical box. It turned out the screw holes in the box were stripped. To fix the problem, I slipped small zip ties into the stripped holes, which allowed me to tighten the screws until snug.

Stan Stegelman



## No more rolling

To keep my X-Acto knives from rolling off the table and stabbing me in the foot, I put zip ties around them. This trick also works great for preventing short pencils from getting stuck down in narrow tool belt pockets, and carpenter's pencils from falling through the cracks when used as spacers between deck boards.

Justin Mitchell





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See p. 4.



### No more wandering

Sometimes it's hard to drill a precise hole in masonry because the drill bit wanders just as you're starting to drill. To keep the hole where I want it, I create a small dimple with a hammer and a masonry nail. I store it with my bits so it's always there when I need it.

**Timothy Borg**



### Trash-can helpers

I line my trash barrel with a plastic bag whenever I'm doing yard cleanup. However, when I push yard waste down into the barrel, the bag slides toward the bottom. To remedy this, I use a few spring clamps to hold the bag in place.

**Gordon Watson**

### Utility knife trick

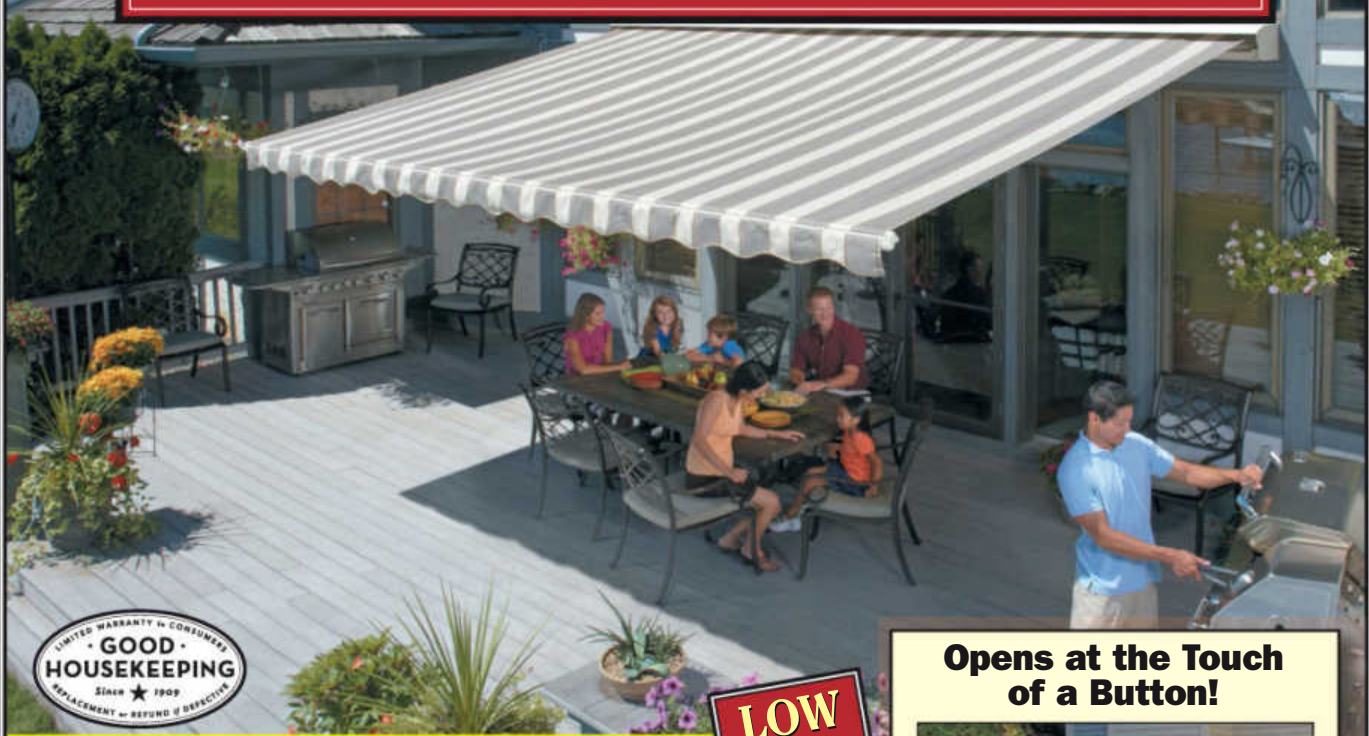
Occasionally, my utility knife would get stuck inside one of the narrow pockets of my leather tool belt. To prevent this, I installed a key ring through the hole in the end of my utility knife. The ring also makes it easy to hang my utility knife on a nail in the workshop.

**Ted Kozlak**





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# 25 TIPS FOR PAINTING CABINETS





by Jeff Gorton

editors@thefamilyhandyman.com

If you want to upgrade your kitchen without spending a lot of money, painting your kitchen cabinets is the perfect DIY solution. New types of water-based paint like acrylic alkyds and acrylic urethanes have made it much easier to get a durable, professional-looking job. These finishes can be cleaned up with water and don't make your house smell like a chemical factory. And quality tools like mini rollers and good consumer-grade sprayers allow even beginners to get pro results.

For complete step-by-step instructions, go to [familyhandyman.com](http://familyhandyman.com) and search for "painting kitchen cabinets." Then read these tips to achieve the best results in the least amount of time.



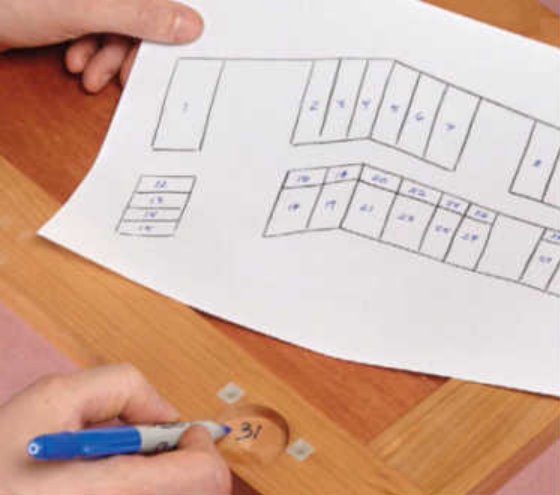
## 1 Protect countertops with rosin paper

Painting cabinets is a messy job, and the last thing you want is paint all over your countertops. An easy way to protect your countertops, backsplash and floor is to cover them with inexpensive rosin or brown builder's paper. A 35-in.-wide by 140-ft.-long roll costs about \$12. When you're done in the kitchen, you'll have plenty of paper left for future painting projects.



## 2 Remove doors, drawer fronts and hardware

We've all seen painting projects where the hinges and hardware are covered with paint and paint is slopped over drawer interiors. It's tempting to leave the doors in place for painting, but you'll get much neater and more professional-looking job by removing them as well as all the hardware. On many modern cabinets, drawer fronts can be removed from the drawer by backing out a few screws. But if your drawer fronts are part of the drawer and can't be removed, use masking tape to cover the drawer sides and bottom if you don't want to paint them.



### 3 Label doors

Start by making a quick sketch or two showing all the doors and drawers. Number them however you want. Then label the doors and drawers with the corresponding number when you remove them. Write under the hinge locations where it won't be visible. Then cover the numbers with masking tape to protect them while you're painting.



### 5 Consider filling open grain

Some types of wood have grain with many open pores. Oak is a good example. The pores show through finishes and are especially noticeable under paint. It's OK to leave the grain showing, but if you want a smooth, grain-free look, you'll have to fill the pores before painting. There are a few methods. You can apply several coats of a high-build primer, sanding between coats until the pores are filled. Or you can fill the grain with spackling as shown here. If your cabinets have a lot of curves and molded edges, filling with spackling is more difficult. When the filler dries, sand and prime as usual to finish the job.



### 4 Don't go overboard on sanding

You should sand cabinets before painting them to give the new paint a good surface to grip. But you don't need to sand to bare wood. If your cabinets have a factory finish, sand lightly with 120-grit sandpaper or a sanding sponge. If the surface is rough from a previous paint job or poor varnishing job, start with coarser 100-grit paper to remove bumps. Then sand again with 120-grit to get rid of any sanding marks.



### 6 Vacuum, then use a tack cloth

To ensure a smooth paint job and good adhesion, it's critical that you remove all the sanding dust from the doors, drawer fronts and cabinet frames. Start by vacuuming everything using a soft bristle brush attachment. This removes loose dust, but you still need to get rid of the rest.

The traditional painter's method is to use tack cloths. You can buy them in packs at the paint department (about \$1 per cloth). To use a tack cloth, completely unfold it and loosely bunch it up. Wipe it gently over the surface to pick up dust. Shake it out frequently and re-form the bundle to use it again. When the cloth has lost its dust-grabbing ability, throw it away and get a new one.





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**FORGET  
ME NOT**

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Here's the good news, you haven't been forgotten. There has never been a better time to rethink your Hep C, because people like you may benefit from scientific advances that could help cure your Hep C. Cure means the virus is not detected in the blood when measured three months after treatment is completed.

---

Call a **Hep C Educator** at **844-4HepcHope** who will help guide you in preparing a **personalized plan** for a conversation with your **Hep C specialist**. Register for more information at **HepcHope.com**.

---

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## 7 Support doors on standoffs

You can buy plastic painter's pyramids, which work great for supporting doors while you paint them. Or you can make your own standoffs by driving 2-in. screws through 3-in. square scraps of plywood. If you don't mind a few barely visible dimples on the back of your doors, you can paint both sides of a door at once using standoffs.

Here's how. Paint the back first, leaving the edges unpainted so you'll have a spot to put your fingers when you turn the door over. Paint the back. Then flip the door over and rest it on the screw tips. Now you can paint the door edges and front, then let the door dry. If you look hard, you can spot tiny indentations where the screws contact the wet paint, but they're inconspicuous.



## 8 Double-check for defects after priming

The first paint-prep step after cleaning grease from cabinets is usually filling unwanted holes, dents and dings with spackling or wood filler. After sanding, getting rid of dust and priming the cabinets, it's a good idea to check everything with a bright light to spot and fill any remaining holes or dents. It's usually easier to spot these problems after priming.

We prefer filling with an oil-based spackling compound like MH Ready Patch because it sticks well and dries hard for a durable repair. But other fillers will also work. The downside of this additional round of spackling is that you'll have to reprime the patched areas.

## 9 Get the grease off

Even the best paint won't stick to greasy cabinets. So the first critical step in preparing your cabinets for paint is to clean them with a grease-cutting solution. Dishwashing liquid will work, but a dedicated grease remover like TSP substitute is even better.

Mix according to the instructions and scrub the cabinets. Then rinse them with clear water and wipe them dry with a clean rag.



## 11 Pro tip: Use an enamel underbody primer

Water-based paint has come a long way, and some top-quality acrylic alkyd hybrids rival oil-based paint. Still, many pro painters prefer oil-based paint, especially for priming. Oil-based paint dries slowly and levels well. This gives you more working time and fewer brush marks. Also, when they're dry, oil-based primers like Benjamin Moore Fresh Start Enamel Underbody sand easily to provide a perfect base for your finish coat.



## 10 Choose a fast-drying primer

Want to speed up the project? Choose a fast-drying primer for the first coat. Read the label for information on recoating time and to make sure the primer is compatible with the paint you're planning to use.

## 12 Sand lightly between coats

Dust can settle in the paint or primer as it dries. For the smoothest final coat, sand between coats of primer or paint with 220-grit sandpaper or an extra-fine sanding sponge. Then vacuum and tack as usual before recoating.



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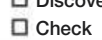
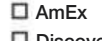
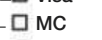
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**03 NAVY**

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## 13 Paint with a mini roller

A good painter can work wonders with a brush, but for most of us a mini roller is a great alternative. You'll find mini roller frames and sleeves at home centers and paint stores. There are many roller sleeves available, but for painting cabinets, mohair, microfiber or foam sleeves are good choices. Foam sleeves will leave the smoothest finish, but they don't hold much paint, so you'll be reloading frequently. Experiment on the inside of doors to see which sleeve works best with your paint.



## 14 Condition your paint for better flow

If your paint seems too thick and isn't leveling out after it's applied, try mixing in a paint conditioner like Floetrol. Read the instructions for the correct proportion of conditioner to paint. Conditioned paint is often easier to apply and dries to a smoother finish.

## 15 Strain your paint

Our pro painting consultant insists that even fresh paint should be strained before use to remove any small lumps that could mar the paint job. If you don't want to go to this extreme, at least filter any leftover paint and paint from a can that's been used. You can buy paper cone filters in any paint department.



## 16 Scuff up profiles with a pad

When you're sanding a smooth finish to provide a better surface for paint, use a green abrasive pad to sand the molded profiles. Sandpaper doesn't conform well enough to get into all of the intricate spots.



## 17 Buy a top-quality brush

If you decide to paint with a brush, splurge on a good one. For cabinets, a 2-in. brush like the one shown here is just about perfect. Expect to spend about \$12 to \$14 for a pro-quality brush. Keep it clean and it will last for many paint jobs. Paint stores usually offer the widest selection and the best advice.

## 18 Dampen your brush

It's easier to clean your brush if you dampen it with water (for water-based paints) before you start painting.

## 19 Follow the wood grain

If you're painting frame-and-panel doors, follow the direction of the wood grain with your finishing brushstrokes. The vertical stiles should receive the last brush strokes running from top to bottom.



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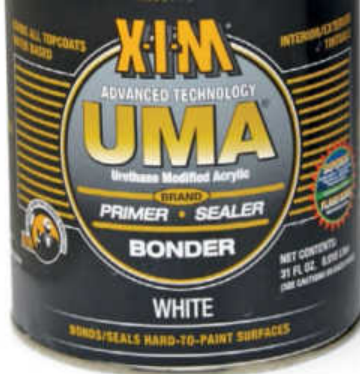
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## 20 Wipe the edges

When you're painting the edge of a cabinet door, it's easy to apply too much paint and create a buildup along the edge. To avoid a dried ridge of paint along the door edge, smooth out any paint that's lapped over onto the adjoining surface with a paintbrush or small sponge brush.



## 21 Worried about adhesion? Try acrylic urethane

Acrylic urethane has many properties that make it a perfect primer for cabinets. First, it sticks tenaciously to almost any surface. You could even paint over plastic laminate cabinets with acrylic urethane. Acrylic urethane also cures to a very hard and durable finish. You can use acrylic urethane primer and cover it with your choice of paint. Or you can use acrylic urethane paint as the final coat too. Insl-X Cabinet Coat (not shown) is one brand of acrylic urethane paint formulated for cabinets.

## 22 Roll, then brush

If you're old-school and still like to paint with a brush, you can speed things up by first applying the paint with a mini roller. Roll on the paint. Then drag the paint bristles lightly over the surface to even out the coat and eliminate roller marks.

## 23 Choose the right paint

Read the label and choose paint that's formulated for painting woodwork and cabinets. And remember, glossier surfaces highlight imperfections, so unless you're a very meticulous painter, consider an eggshell or a satin sheen.

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**25**

**Spot-prime with shellac**

Pigmented shellac in a spray can (BIN is one brand) is perfect for spot-priming areas you may have missed or areas you have patched and sanded. Shellac sticks well to most finishes, dries quickly and covers well.

## 24 Consider spray-painting the doors

With a little practice and a good sprayer, you can achieve factory-finish quality by spraying your doors. A pro-quality airless sprayer will work best to spray unthinned water-based finishes. But you can also get great results with a high-volume, low-pressure (HVLP) sprayer. Just be sure to thin the paint according to the instructions and apply several thin coats rather than one thick one.

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# LOW WATER PRESSURE?



How to find and  
fix water supply  
problems

## The first thing you need to know

### Pressure vs. flow

When a showerhead or faucet isn't delivering enough water, everyone complains about low "pressure," but pressure usually isn't the problem. Water pressure is the force. "Flow," on the other hand, is the more likely culprit in most homes.

by Jason White

[editors@thefamilyhandyman.com](mailto:editors@thefamilyhandyman.com)

ART DIRECTION: MARCIA ROEPKE • PHOTOGRAPHY: PAUL NELSON • CONSULTANTS: LES ZELL, ZELL PLUMBING & HEATING, KEN CERPOVICZ, WATER WORKER/AMTROL, INC.

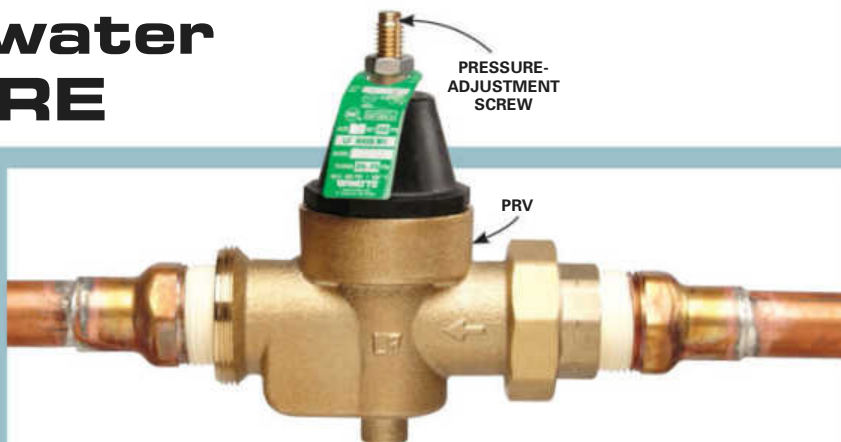


# Improve water PRESSURE



## Check the pressure

"Pressure" is the physical force exerted on water by a municipal pumping station or private well pump, measured in pounds per square inch (psi). Spend \$10 at your local home center and get yourself a water pressure test gauge. You just screw it onto an outdoor hose bib and turn on the water. If your gauge reads 40 to 60 psi, you've got good pressure.



## Inspect your pressure-reducing valve

If your pressure test reads lower than 40 psi, see if you have a pressure-reducing valve (PRV) mounted on your water main. It'll look similar to the one pictured here, and it needs to be adjusted correctly. Most come set from the factory for 50 psi, but you can adjust them up or down by turning a screw on top. PRVs can also go bad after 10 to 20 years and cause too little (or too much) pressure. So if yours is old, it might be time to replace it. Just about any DIYer with a little plumbing experience can handle the job. A new PRV will cost you \$35 to \$120, and you might have to special-order it.

## Call city hall

If after all that you've still got low water pressure, call your local water department to see if there's a problem with the pressure coming from the street to your house. If you get your water from a private well and suspect that your well pump might be the cause of your pressure woes, visit [familyhandyman.com](http://familyhandyman.com) and search for "well pump."

## Install a water pressure booster

If your water department can't deliver more pressure and you have a 3/4-in. or bigger copper or plastic water main coming into your house, consider installing a water pressure booster. It takes the water coming in from the street and increases its pressure by means of an electric pump and a pressure tank. The tank holds a reserve of pressurized water so that the pump doesn't have to run every time somebody opens a faucet. It also helps boost flow when the demand for water is high (like when your teenagers are all showering at the same time). Water pressure boosters like the one shown here are available at home centers and online for about \$900.

## Too MUCH water pressure?

When it comes to water pressure, you actually can have too much of a good thing. Pressure over 80 psi can cause you to waste water and the energy required to heat it. It can also damage water softeners, water heaters, faucets, appliances and seals. If your pressure test shows more than 80 psi, make sure you have a working pressure-reducing valve and keep it set between 50 and 60 psi.



# Improve water FLOW

## Start with the small stuff

If you have poor water flow at most or all of your faucets, think about things like old galvanized steel pipes or a busted water softener. But if just one faucet is weak, look for isolated causes like clogged aerators and shutoff valves. Start with the small stuff, not the big stuff.

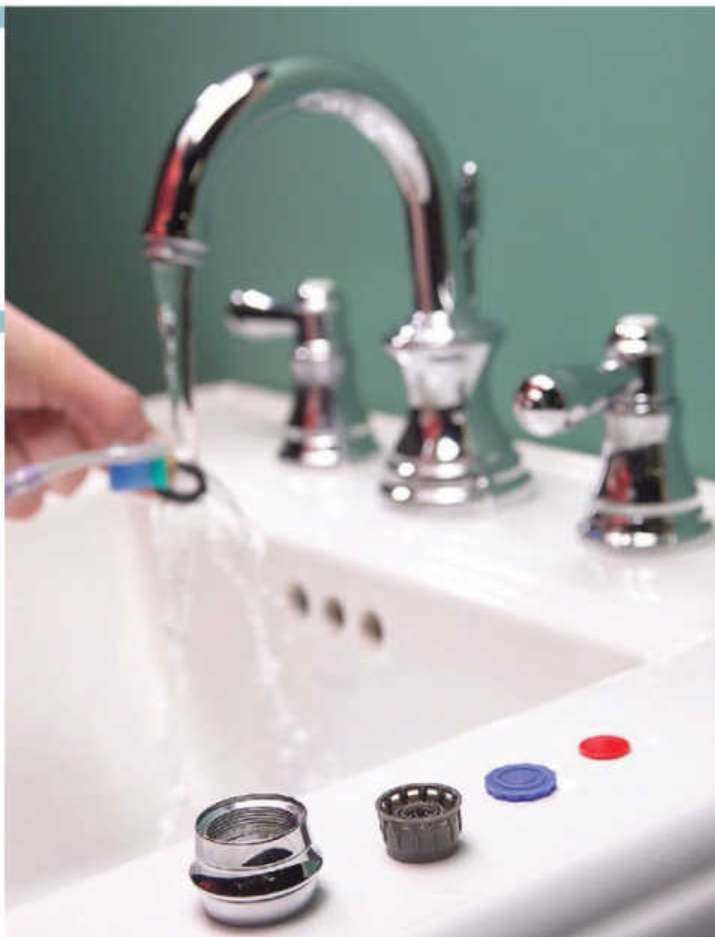
## Clean aerators

Aerators add air to the stream of water coming out of your faucet, which helps to reduce splashing and conserve water. Many contain multiple parts like flow restrictors and screens—a perfect place for stuff to get stuck. Cleaning an aerator is one of the easiest and most common solutions for low flow.



## REMOVE THE AERATOR

You just remove the aerator with a pair of groove-joint pliers. Cover the jaws with electrical tape so you don't scratch the finish.



## SCRUB ALL THE PARTS

Next, scrub all the parts clean with an old toothbrush. Be sure to close the drain or cover the hole with a rag so your parts don't fall down it, and set all the parts on the side of the sink in the order you removed them to make reassembly easier. Soak the parts in vinegar overnight if you have a lot of mineral buildup. If they just won't come clean, buy a replacement aerator. Exact replacements can be hard to find locally, so you might have to special-order one. To find online retailers, search for "faucet aerator."

## Unplug showerheads

If your showerhead used to work fine but now just spits at you, it's probably clogged with mineral buildup (you'll usually see a ring of deposits surrounding each hole). Remove the showerhead and soak it in vinegar overnight. (Test the vinegar on an inconspicuous spot first to make sure it doesn't harm the finish.) Use a toothpick to poke the holes clean, then rinse it with water. Some newer showerheads have rubber-lined holes that you can just pick with a fingernail to unclog the holes; you don't have to remove the showerhead.





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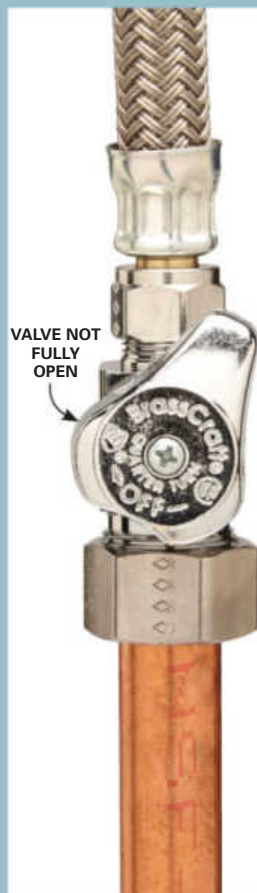
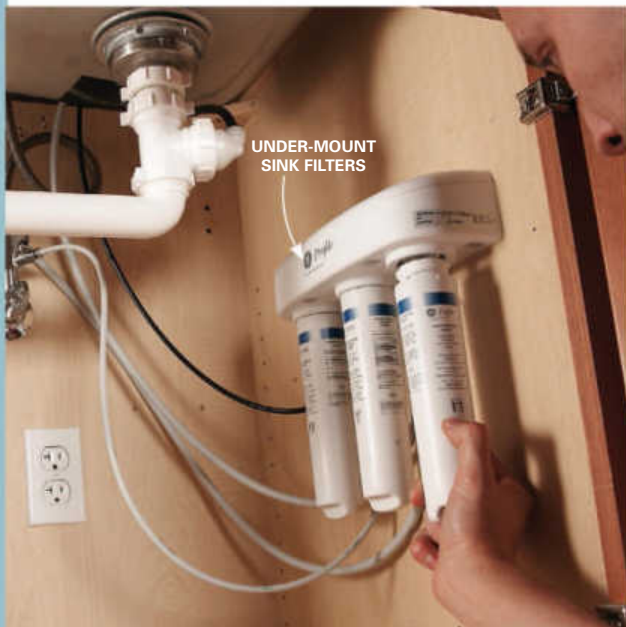
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## Replace water filters

Water filters do a great job of keeping crud out of your plumbing system and make water smell and taste better, but they can also slow down the flow of water if you don't replace them regularly. If you have a whole-house sediment filter and you're always forgetting to check it, replace it with one that has a clear housing so you can easily see when it needs changing. And don't forget to change the filters under your sink and the water and ice filter inside your fridge too.



## Open plumbing valves

Make sure all the fixture shutoffs in your kitchen and bathrooms are fully open, as well as the plumbing valves in your basement or crawl space. Stop valves and gate valves have round handles that you turn counter-clockwise to open. Ball valves have straight handles and are open all the way when the handle is in line with the piping.

You might find a smaller version of a ball valve, called a quarter-turn valve (shown at left), under your sinks and toilets. If the handle is even slightly askew, it could be impeding water flow.



## Clogged pipes and elbows

If you have old galvanized steel pipes and elbows in your plumbing system, they're probably reducing your water flow. Any type of pipe or tubing can clog, but these ancient relics are notorious for corroding internally to the point that water can barely pass through. Consider replacing galvanized steel piping with copper, CPVC or PEX tubing. Complete replacement is a huge job that usually requires tearing into walls and ceilings. But in many cases, just replacing the exposed horizontal pipes in your basement or crawl space is enough to dramatically increase water flow.

## FLUSH PIPES AFTER WORKING ON THEM

Any time you do plumbing work, there's a chance that bits of solder, Teflon tape and crud that break loose can clog a faucet or fixture if you don't flush the pipe or hose supplying it. Disconnect hoses downstream from the part of the plumbing system you were working on, then open the shutoffs (one at a time) and let some water flow into a bucket before reconnecting.





## Galvanic corrosion

This type of corrosion occurs when you join pipes made of dissimilar metals like galvanized steel and copper. You'll often see it happening on the tops of water heaters where galvanized steel nipples are connected to copper pipes. The corrosion can get so bad that it clogs the inside of the pipes. The photo above shows a dielectric union that was supposed to prevent corrosion by separating the two metals, but they were still close enough for corrosion to occur.

For maximum protection against galvanic corrosion on water heaters, use both dielectric unions AND dielectric nipples. Both have non-metallic liners that keep the two different metals from touching or being close enough to cause corrosion.



## Is it time to replace your water main?

If you've tried everything and you're still not getting enough flow, you might need a new water main—the underground pipe that carries water from the street to your house. Remember that “pressure” and “flow” are different. You might have good pressure at the main, but the main's flow might be restricted. This is especially common with older galvanized steel mains, which clog over time from corrosion buildup.

Old mains are also often just too small. A modern water main—usually 3/4-in. or bigger copper or plastic—could make a huge difference. You might also be able to avoid tearing up your yard to install one if your contractor uses an underground boring machine. Also see if your municipal water department will give you a water meter with larger-diameter fittings.

## WELLS AND WELL PUMPS

Whether you get your water from a private well or your local water department, everything discussed here about troubleshooting and fixing flow problems still applies. For pressure problems related to well pumps, visit [familyhandyman.com](http://familyhandyman.com) and search for “well pump.”



## WATER SOFTENERS

Water softeners do a great job of keeping mineral deposits (hardness) from forming and clogging faucets, fixtures and pipes—but only if you keep them in good working order. For tips on maintaining and repairing water softeners, visit [familyhandyman.com](http://familyhandyman.com).

# DIY Quiz

BY TRAVIS LARSON

editors@thefamilyhandyman.com

**Put on your thinking cap and take this month's quiz to see just how smart you are when it comes to DIY. Here's how it works:**

- There are easy, intermediate and really tough questions all mixed together.
- There may be more than one correct answer!
- The answers are on pp. 52-53. Get your DIY rating on p. 52. Good luck!

**1. Changing your car's coolant (antifreeze) according to the manufacturer's recommended schedule is critically important because:**

- A. Coolant loses its cooling ability as it ages.
- B. The anticorrosive and lubricating additives deteriorate.
- C. Old coolant doesn't flow as easily, increasing the risk of overheating.
- D. It never needs to be changed. The two coolant chemicals used today, polyethylene glycol and polypropylene glycol, never break down.

**2. This old polyurethane varnish:**

- A. Is no longer usable.
- B. Just needs the goo skimmed off, then the rest stirred and strained.
- C. Can be salvaged by adding a solvent.
- D. Can be used as a wipe-on varnish.



**3. Which gauge wire is used for a 20-amp circuit?**

- A. 12-gauge
- B. 14-gauge
- C. 16-gauge
- D. It depends on the number of devices (switches and outlets) on the circuit.

**4. What is special about "Type X" drywall?**

- A. It's more fire resistant than ordinary drywall.
- B. It has embedded fiberglass.
- C. It is required for ceilings with 24-in. spacing between the framing members to prevent the sagging you'd get with 1/2-in. drywall.
- D. All of the above.





**5. True or False?** This outlet is designed for 240-volt plugs.



**9. True or False?**  
Fall is the best time of year to plant grass seed.

**10. What is the advantage of a “flagged” paintbrush?**

- A. It can be used for both water- and oil-based finishes.
- B. It holds more finish than an ordinary paintbrush.
- C. There is no advantage.
- D. It leaves fewer brush marks.

**11. The No. 1 cause of ruined car batteries is:**

- A. Heat
- B. Subzero temperatures
- C. Leaving your lights on
- D. Leaving your cell phone charger plugged in

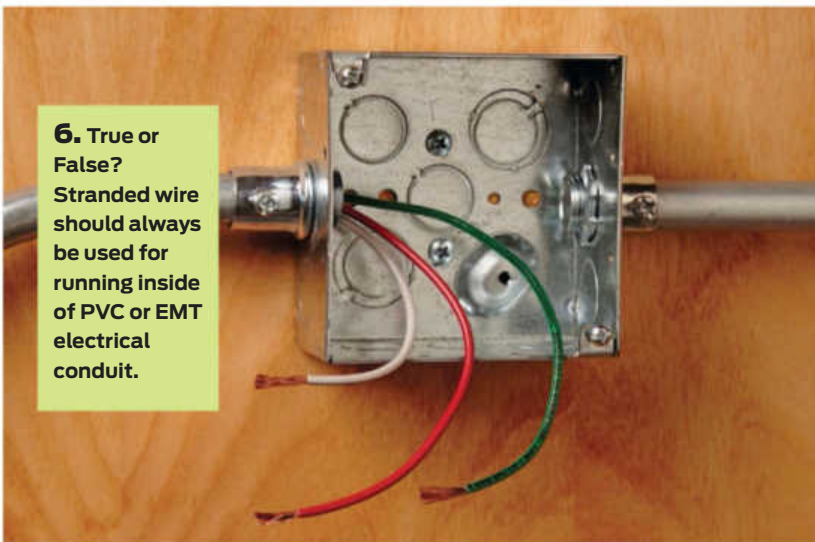
**12. Which activity is associated with the term “back-butter?”**

- A. Drywall taping
- B. Tiling
- C. Cabinetmaking
- D. Pastry making

**13. True or False?** Always use 9-volt lithium batteries in your smoke detectors because they last much longer than alkaline batteries.

**14. What is “thermal bridging”?**

- A. The transfer of heat from inside wall surfaces to outside walls.
- B. The transfer of heat through solid framing materials like studs or beams and metal or plastic window and door frames and sashes.
- C. The movement of warm air through unsealed areas around vent pipes, electrical cables or other ceiling penetrations, allowing heat to escape into the attic.
- D. Any heat loss through any building assembly.



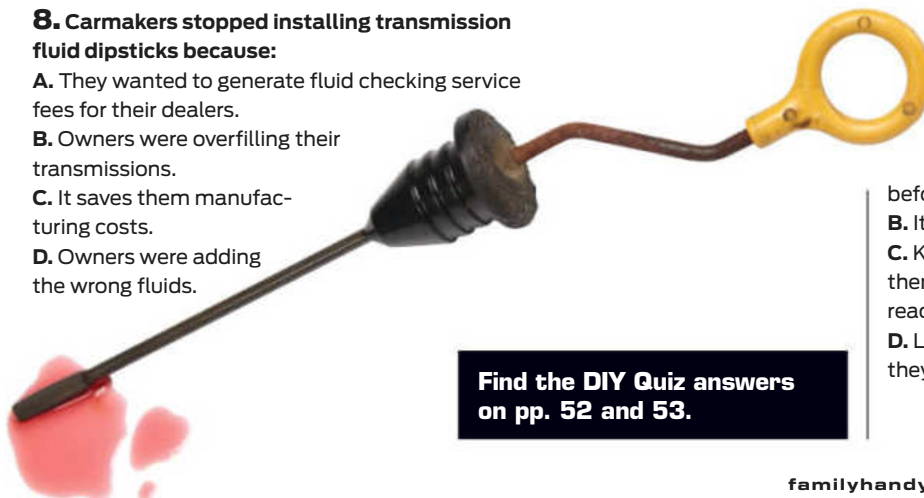
**6. True or False?**  
Stranded wire should always be used for running inside of PVC or EMT electrical conduit.

**7. Where is bull nose tile used?**

- A. Wherever unfinished tile edges are exposed.
- B. At the base of tiled walls.
- C. Along bathtubs and shower bases.
- D. All of the above.

**8. Carmakers stopped installing transmission fluid dipsticks because:**

- A. They wanted to generate fluid checking service fees for their dealers.
- B. Owners were overfilling their transmissions.
- C. It saves them manufacturing costs.
- D. Owners were adding the wrong fluids.



**Find the DIY Quiz answers on pp. 52 and 53.**

**15. The proper way to charge lithium-ion batteries is to:**

- A. Run them completely down before recharging.
- B. It depends on the charging system.
- C. Keep them fully charged but remove them from the charger when they reach full charge.
- D. Leave them in the charger whenever they're not in use.

# DIY Quiz Answers

**1. (B)** The anticorrosive and lubricating additives deteriorate. When that happens, electrolysis eats away at all the dissimilar metal components in your cooling system, resulting in costly radiator, heater core and water pump repair or replacement.

**2. (B) & (C).** Discard the jelled part and try applying the finish to a wood scrap. See how it flows and cures. If that goes well, go ahead and use it. If it's too thick, add up to 10 percent of the appropriate solvent (usually mineral spirits or water) and stir it well. Straining is always a good idea to ensure particulate-free finishes.

**3. (A)** Only 12-gauge wire should be used on 20-amp circuits. Thinner 14-gauge wire could overheat and become a fire hazard well before the 20-amp circuit breaker tripped.



**5. False.** This is an outlet designed for 20-amp circuits. Some plugs on various appliances have configurations that match the "T" slot, making it impossible to mistakenly plug them into 14-amp circuits.

**6. False.** Either will work. Some electricians prefer solid wire to stranded because it can be pushed rather than pulled through shorter lengths of conduit, which saves time. It's also easier to attach solid wire to device terminals. However, stranded wire is much easier to fish through long lengths of conduit with lots of turns.



**7. (A)** Bull nose tile comes in various configurations but generally has a rounded edge to give a finished look to the exposed edges of tiled areas. Not all tiles have matching bull nosing, so keep that in mind while you're shopping if your tile job calls for exposed tile edges.

**8. (B), (C) & (D)** Transmission fluid level is supposed to be checked with the fluid hot. But owners were checking when the transmission was cold and then overfilling. The gears whip excess fluid into foam, which doesn't cool well and can cause shifting problems. Also, owners were adding the wrong transmission fluid, causing harsh shifting. To check the fluid on new cars, you have to remove the fill plug and check levels with your finger. (Give yourself credit if you got two of the three.)

**9. True** (generally). Early fall is a great time because the hot weather is over so there's less chance of newly sprouted grass drying out and dying. Spring is also an acceptable planting season, especially if the area has tree shade. Bare trees allow sunlight to reach the ground, which warms it and speeds germination in cooler months.

## WHAT'S YOUR LEVEL OF EXPERTISE?

Beginner: 0 – 5 correct

Intermediate: 6 – 12 correct

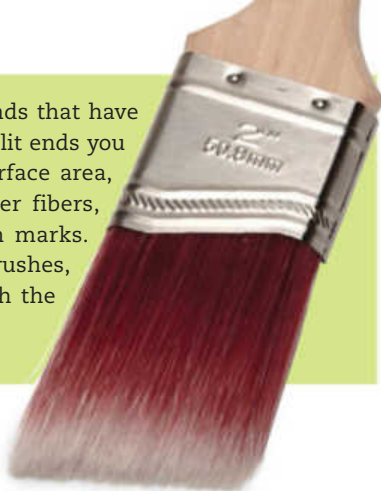
DIY Guru: 13 – 15 correct

**4. (A)** Type X is used when more fire resistance between rooms is called for, such as in walls connecting the house and garage or common duplex walls.





**10. (B) & (D)** “Flagged” bristles have ends that have been machined into the same type of split ends you get on your hair. That means more surface area, which holds more finish, and also finer fibers, which means fewer and smaller brush marks. High-quality brushes, especially sash brushes, most likely have flagged bristles though the label may not say so.



**11. (A)** Heat is far more damaging to a car battery than cold weather. It's such a huge issue, especially in late-model cars with small grille openings, that carmakers install battery insulation blankets to protect them from high under-hood temperatures. If you replace the battery but leave off the insulation blanket, you'll decrease the life of your battery. So don't blame the cold snap for your dead battery. It developed a life-ending disease last summer.



**12. (B)** Tilers often back-butter the underside of tiles (especially large tiles) with mastic or thin-set for a better bond and full support without any voids. They also back-butter when it's too difficult to apply mastic or thin-set to the wall or floor surface.

**13. False.** Replace smoke detector batteries with the type recommended by the detector manufacturer. Lithium batteries last a long time, but they die quickly when they're depleted. Some smoke detectors can't detect that rapid voltage drop, so they don't provide an end-of-life chirp to let you know the battery should be replaced.

**14. (B)** Up to 10 percent of a home's exterior surface has wood framing directly behind the siding. That

wood transmits much more heat to the outside than adjoining insulated wall spaces do.

**15. (B)** Read and follow the instructions that come with the tool. Some tools have chargers with sophisticated electronics that prevent damage to the battery from overcharging and can be left in the charger full time. Cheaper or older systems may require more care when charging.



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## Stop drafts cold at electrical boxes

The small air gaps around electrical boxes on exterior walls and ceilings leak more air than you might imagine. In fact, a mere 1/8-in. gap around just six ceiling boxes is the equivalent of cutting a 4-in. hole in your ceiling. Think of the amount of heat you'd lose! When you combine that with the leaks around all the electrical boxes in outside walls in your house, it's no wonder your house feels drafty.

Many homeowners install plain foam gaskets between the cover plate and the switches/receptacles. However, those gaskets don't always seal well. Infrared thermograph images of those outlets will show cold air still entering (which means warm air escaping) the house.

We'll show you more effective methods that permanently seal those leaks. Sealing is easy to do and you can complete the entire house in about four hours. The materials cost less than \$25, one of the best investments you'll ever make! All you need is a caulk gun, caulk and aerosol foam. Here's how to do it.



### Buy the materials

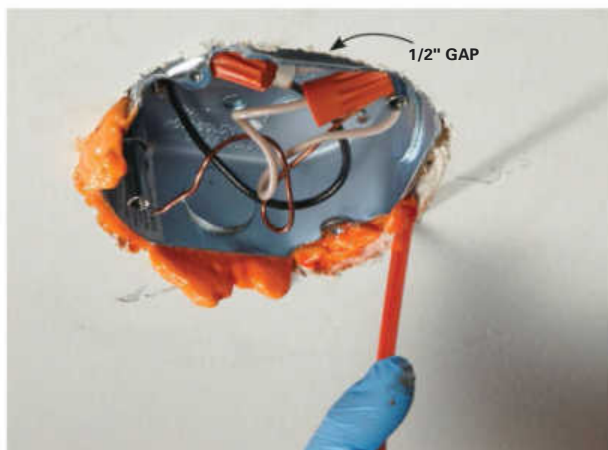
Gaps around ceiling boxes must be sealed with an "intumescent" fire-blocking caulk or foam. Ordinary spray foam burns too quickly, opening the gap and creating a chimney effect that feeds the fire. Intumescent caulk or foam, on the other hand, swells when heated so it prevents that airflow. Regular caulk or foam can be used on wall-mounted boxes.

If the electrical boxes aren't mounted flush with the drywall, adding a box extender will make them easier to seal. They're available at most home centers for single, round and multiple-gang boxes.

### Seal ceiling boxes

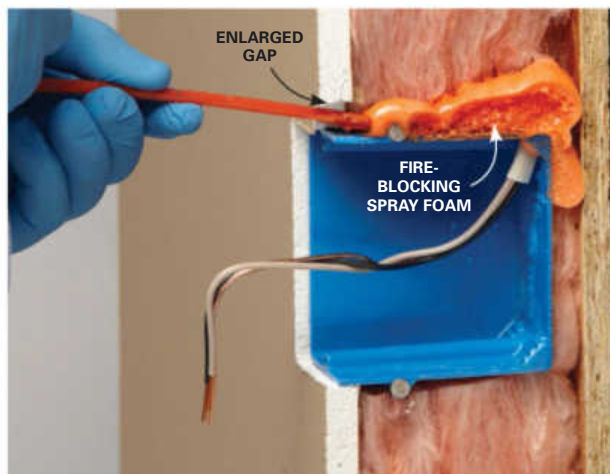
Intumescent foam works best to seal large gaps (larger than 1/8 in.) around ceiling boxes. But the foam drips out as it expands and is difficult to





## 1 FILL CEILING BOX GAPS WITH FIRE-BLOCKING FOAM

Invert the spray foam can and shove the tube up into the gap. Gently squeeze the trigger and slowly pump foam into the gap. Let it cure for about two hours. Then cut off the excess and reinstall the light fixture.



## 2 SEAL THE WIRE INTRUSIONS

Align the straw with the wire intrusion(s) and squeeze the trigger to shoot a small dollop of foam around the box opening. Don't overdo it or the foam will force its way into the electrical box and you'll have to remove the excess later.



## 3 SEAL AROUND A FLUSH-MOUNTED BOX

Apply foam or caulk into the gap around the flush-mounted box. After foam hardens, you can slice off the excess with a serrated knife.

remove after it cures. So turn off the power and double-check with a voltage sniffer. Then remove the light fixture, spread a drop cloth to protect the floor below, and inject the foam (**Photo 1**). Intumescent fire caulk doesn't drip like foam, so you don't have to remove the light fixture or cover the floor.

## Seal flush-mounted wall boxes

Sealing wall boxes is a two-step process: First seal the cable intrusions and then the gap around the box. To locate open box knockouts, shine a light inside to see where the cables enter the box. That way you'll know where to inject the foam. If you can't spot the entry points, turn off the power and pull the switch or receptacle out far enough to see.

Next, enlarge the gap above and below the box (if needed) to provide room to insert the foam straw deep into the wall cavity. Then seal the wire intrusion openings with foam (**Photo 2**). We used intumescent fire-blocking foam to seal the wire intrusions as an added measure of safety, but it's not required by code. You can use regular spray foam. However, never seal the intrusions from inside the box—that doesn't meet code and you'll have to remove the sealant if it's ever inspected. Finish the job by shooting ordinary foam around the box (**Photo 3**).

## Seal recessed wall boxes

Sometimes wall-mounted electrical boxes are recessed because of an installer error or new tile installed over the old layer. You can seal around the gap with caulk, but that doesn't solve the problem of the box not being flush with the wall. That's where a box extender comes in handy. It provides solid mounting for the switch or receptacle and makes the box easier to seal.

Start by sealing the wire intrusion following the procedure above. Then turn off the power (check it with a voltage sniffer) and slide on a box extender (**Photo 4**). Then seal the gap around the box extender (**Photo 5**).

## Cover the mess with a bigger plate

If your caulking/foaming job got out of hand and extends beyond the cover plate, you don't have to repaint the wall to cover your tracks. Just buy a "jumbo" cover plate (about \$1.50).



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**4 ADD A BOX EXTENDER**  
Unscrew the switch or receptacle and twist it at an angle. Then slide the box extender over the device and into the wall box. Remount the device, straighten it and then tighten the screws.



**5 SEAL AROUND THE BOX EXTENDER**  
Squirt caulk between the box extender and the wall. Smooth the caulk bead with a wet finger.



## FIX LEAKY CAN LIGHTS

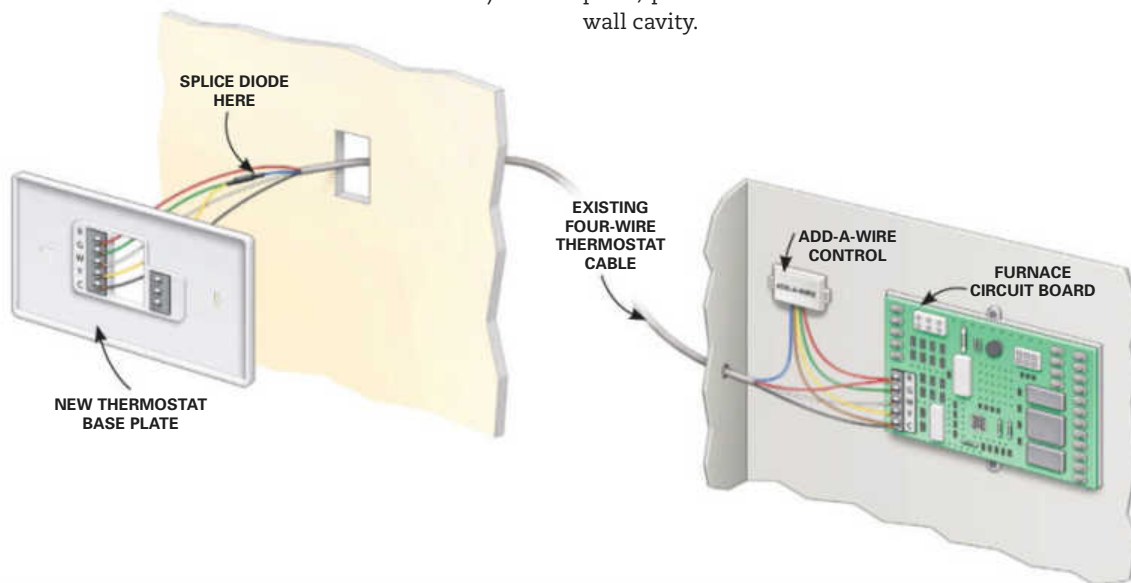
If you have older recessed lights in a ceiling under an attic space, you're likely losing a lot of heat through the holes in the housing and around the base of the fixture. Caulking those openings or covering the fixture with an airtight box can create a fire hazard. The easiest and best solution is to buy an airtight LED retrofit light/baffle kit (one choice is the Halo No. RL560WH-R; \$30 at homedepot.com). Just remove the bulb, screw in the threaded adapter and snap the LED unit in place—no more air leakage.



## Install a Wi-Fi thermostat without rewiring

If you've checked into installing a Wi-Fi thermostat but discovered your house doesn't have a common "C" wire, here's a workaround. Buy a four-to-five wire adapter (such as a Venstar ACC0410 Add-A-Wire Accessory, \$25 at [smarthome.com](http://smarthome.com)). The

adapter provides a "C" connection using whichever wire isn't in use at the time. Install the control box inside the furnace and connect it as shown here. Then install the diode device up at the new thermostat. Once all the wires are connected to the base plate, push the excess wires and diode inside the wall cavity.



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# Top Ten TIPS

BY JEFF GORTON

[editors@thefamilyhandyman.com](mailto:editors@thefamilyhandyman.com)

## Working with epoxy

Boat builders, surfboard makers and fabricators of all kinds use epoxy every day to form strong, waterproof, lightweight structures. And you can take advantage of this versatile group of products around the home, too. Epoxy for household use is available in liquid, gel and putty and in containers ranging from a mere half ounce to gallons.

Unlike many other adhesives and fillers that require drying time, epoxies require two parts that, when mixed, begin a chemical reaction that causes the liquid or putty to harden. The amount of time you have to work with the epoxy before it sets up is determined by the chemistry of the hardener. For tiny jobs, you can choose one-minute epoxy, but in general, epoxy that takes longer to set also forms a stronger bond, not to mention giving you more working time.

Epoxy has several advantages over other adhesives and fillers. It can fill gaps and still retain strength, it's waterproof, and it sticks well to most surfaces. Read the label to choose an epoxy that matches the repair you're attempting. Here are some useful tips to help out.



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## 1 Repair chipped furniture

When it would be difficult or impossible to replace missing veneer or chipped furniture parts with real wood, epoxy putty makes a great substitute. Two-part putty in a Tootsie Roll shape is convenient to use and makes a strong repair. Just slice off a section and knead the chunk until the two parts are blended and the color is consistent. Then form the putty into approximately the right shape and press it into the damaged area. Use a wet putty knife to smooth and shape the putty. When the epoxy has hardened to about the consistency of bar soap, carve or scrape off most of the excess. When it hardens completely, you can sand it just like wood.



## 2 Fix loose joints with epoxy resin

Epoxy is one of the few adhesives that can fill gaps without losing strength. That's why it's perfect for repairing loose-fitting joints in furniture. If you have only one or two repairs to make, buy a small quantity of epoxy in a double syringe at a home center or hardware store. Read the instructions on the label and make sure the epoxy is formulated for wood repairs.

Brush a layer of epoxy onto both parts to be joined. Assemble and clamp the parts if necessary. Then wait the specified time for the epoxy to set up. Read the instructions to determine how long the epoxy should cure before you use the furniture. Even five-minute epoxy may take an hour or more to reach full strength. If you're repairing a valuable antique, you may want to avoid epoxy repairs because the result is irreversible.



## 3 Mix it up in a can bottom

If you only need a bit of epoxy for a small repair, you can't beat the bottom of an aluminum can as a mixing container. Just squeeze two-part epoxy into the concave can bottom and mix it up.



## 4 Buy some epoxy pumps

The pumps shown are calibrated so that one pump from each, the resin and the hardener, gives you exactly the right proportion. No more measuring cups or guesswork. And with this setup, it's super convenient to mix a batch of epoxy whenever you need it. The cost of a quart of resin, a pint of hardener and the pumps is a little steep (\$70), but the epoxy will last for years, and a fresh batch of epoxy is just a few pumps away. Make sure to buy pumps that are calibrated for the epoxy you're using.



# Government Melts Over 270 Million Silver Dollars

*But collectors get an unexpected second chance*

It's a *crime*.

Most Americans living today have never held a hefty, gleaming U.S. silver dollar in their hands.

*Where did they go?* Well, in 1918, to provide aid to the British during WWI, the U.S. government melted down nearly half of the entire mintage—over 270 million silver dollars. If all those missing silver dollars could be stacked, they would tower over 400 miles into the sky! If laid in a chain, they would span 6,400 miles—enough to stretch from New York to Los Angeles more than 2½ times!

These vanished coins were not just any silver dollar—they were America's largest circulated coin, the beloved Morgan Silver Dollar. Each Morgan Dollar is struck from nearly an ounce of 90% fine silver and measures a massive 38.1mm in diameter. Morgan Silver Dollars were the engine of the American dream for decades. Created by famed American coin designer, George T. Morgan, they feature Lady Liberty's radiant profile and a majestic eagle, symbols of American strength and prosperity. Since their inception in 1878, they jingled in the pockets of famous and infamous Americans like John D. Rockefeller and Teddy Roosevelt, and desperados Jesse James and Al Capone. Today, Morgan Silver Dollars are the most collected coin in America.

## Lady Liberty takes a Final Bow

Just three years after the massive meltdown, the government gave the Morgan Silver Dollar a final chance to shine. In 1921, facing a serious shortage, the mint struck Morgan Silver Dollars for one more brief, historic year. Today, the last-ever 1921 Morgan Silver Dollar belongs in the hands of collectors, history buffs, or anyone who values the artistry and legacy of this American classic.

## A Private Vault Gives Up its Secrets

Millions *more* silver dollars were melted over the past ninety years and today, private hoards account for virtually all the surviving Morgan Silver Dollars. We should know—we hunt for them every week. In fact, on one buying trip into America's heartland, as we were guided into a wealthy owner's massive private vault, we were thrilled to discover a hoard of nearly two thousand 1921 Morgan Silver Dollars, all in lustrous near uncirculated condition. We wasted no time in securing the entire treasure trove of silver dollars into our own vault.



Actual size  
is 38.1 mm

## Saved from Destruction, but Bound for Extinction

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## 5 Color epoxy repairs with stain markers

Epoxy putty is a handy material for repairing chipped wood or a bit of missing veneer, but if the wood is stained rather than painted, you'll have to blend the repair to make it match. Stain pens work great as a quick way to color an epoxy repair. Start with a lighter base color to match the background. Then add darker colors over the top if needed. Stain markers are available at home centers, hardware stores and paint stores (\$6 for a set of three). For an even more realistic repair, simulate wood grain by making tiny slits in the epoxy with a razor blade before it's fully hardened.



## 6 Conserve epoxy by prefilling with wood

Epoxy putty is expensive, so when you run into deep holes or large areas to fill, start by filling most of the repair with wood. Cut a piece that's small enough to allow a layer of epoxy over the top. Then adhere it by pressing it into a bed of epoxy putty. You don't have to wait for this epoxy to set. You can finish the repair with more epoxy putty right away.



## 7 Replace rotted wood with epoxy putty

For small repairs, you can use the kind of epoxy putty that comes in a two-part roll (see Tip 1). But there's a better choice for repairing larger areas of rotted or damaged wood. Abatron WoodEpoxy and J-B Weld Wood Restore are two examples of two-part epoxy wood repair putty. Mixing parts A and B according to the instructions results in a soft, easily formed putty that you can use to rebuild rotted or damaged wood. For a strong repair, first soak the wood fibers with liquid epoxy to consolidate and firm up loose fibers and create a primer for the putty. Buy epoxy putty and liquid epoxy online or at home centers and hardware stores (\$30 and up).

## 8 Speed it up with heat

When you're working with epoxy in lower temps and need to speed things up, a hair dryer does wonders. Warm up the two parts of the epoxy before mixing or warm up the epoxy after it's applied. You can even warm up the surface you're applying the epoxy to. The heat speeds up the reaction for a quicker cure.







## 10 Try epoxy in a tube for no-mix, no-sag repairs

This tube of epoxy is divided down the middle to separate the resin and hardener. To use it, you install the special tip and put the tube in a caulk gun. The two parts mix in the tip as you dispense the epoxy. The thickened epoxy doesn't sag or run, so it's great for working on vertical surfaces. It's also easy to smooth with a putty knife, which makes it handy for repairing things like cracked siding boards. This West System Six10 Epoxy Adhesive (\$23 per tube) is available online or where boat repair supplies are sold. Remember to buy extra mixing tips if you don't think you'll use the entire tube within about 30 minutes.



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## 9 Spread it out to slow it down

Epoxy heats up as the two parts react after mixing. The heat speeds up the reaction, giving you less time to work. To avoid this problem, spread your epoxy thin after mixing it. This tip works with liquid epoxy too. Wide, shallow mixing vessels are preferable to deep, narrow vessels to greatly slow down the hardening reaction. It works because the epoxy then has more surface area exposed to release heat.

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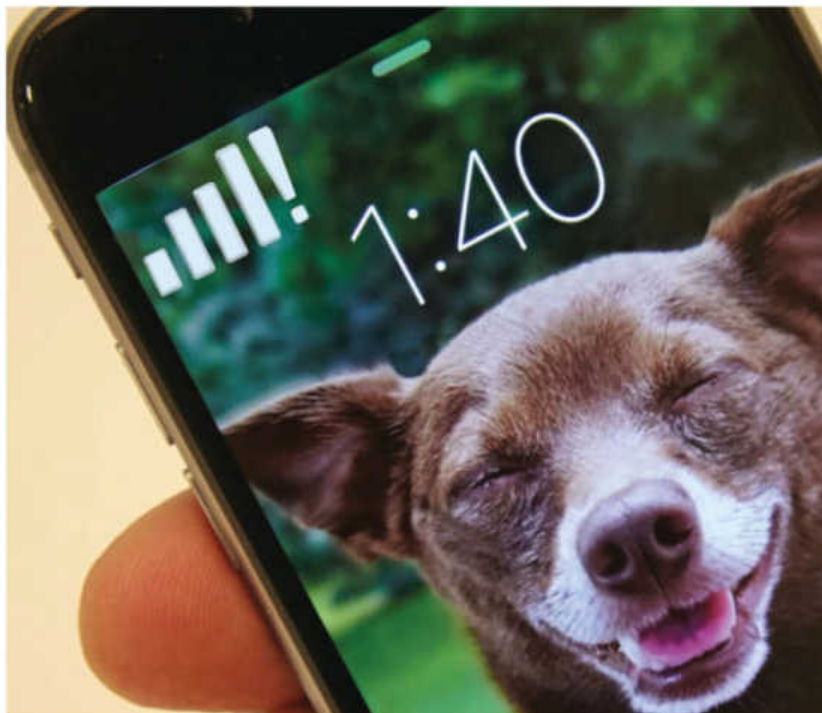
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## Three ways to boost your cell phone signal

If you're one of the more than 90 percent of Americans with a cell phone, you know it's something you can't live without—especially if you've ditched your landline. If that's the case, a strong cell phone signal at home isn't just a convenience; it could save your life in an emergency. So if you're only getting one or two signal-strength bars and your cell phone drops calls like hot potatoes, it's time to shop around for a solution. Here are three options for giving your cell phone signal a much-needed boost.



### 1. NETWORK EXTENDERS

A network extender plugs into your home's Internet modem and acts like a mini cell phone tower. When you make a call, the extender receives the signal from your phone and routes it back to your cell phone provider via the Internet.

Network extenders are provider-specific (Verizon, AT&T, etc.) and cost about \$250. However, you *might* qualify for a free extender if you meet certain criteria. Call your mobile provider's tech support line and explain your situation. Make sure your provider reviews your dropped-call records and see if it'll send a technician out to check the signal strength outside your home. If the signal's weak, you might be offered a free network extender. If it's strong, but the signal *inside* your home is weak (or nonexistent), you'll probably have to pay for a network extender yourself.

Depending on your network provider, you might also experience slower data speeds, so use Wi-Fi for email and surfing the web. For text messages, use a text-messaging app that sends your texts via the Internet instead of your cell phone's data feature.



## 2. SIGNAL BOOSTERS

### How it works

#### OUTDOOR ANTENNA

An outdoor antenna picks up a weak cell phone signal and routes it to the amplifier by coaxial cable.



#### INDOOR AMPLIFIER

The indoor amplifier boosts signal strength and sends it to an indoor antenna through coaxial cable.



#### INDOOR ANTENNA

The indoor antenna broadcasts a stronger signal inside your house.



Signal boosters have been around forever and do just what the name says; they make weak cell phone signals stronger. However, they can't create a signal where one doesn't exist (see "Before You Buy a Booster, Check for Signal Strength" on p. 66).

A booster has three basic parts: an outdoor antenna (usually mounted on a roof or outside wall), an indoor amplifier and an indoor antenna. All three components get tied together with RG-6 coaxial cable. You can install one yourself or hire a pro to do the job.

We show the weBoost product here, but several companies make boosters. Just search online for "cell phone signal booster." They cost a bit more than network extenders, but you won't see a decrease in data speeds and they're not provider-specific. Expect to spend \$300 to \$600 if you install one yourself.

### Do a 'soft' installation first

If you'll be installing a cell phone signal booster yourself, it's best to do a little experimenting with the placement of the components. Place the indoor antenna and amplifier in a central location, but don't fasten anything down yet.

Next, walk around the outside of your house with your cell phone and see where you get the strongest signal. Loosely mount the outdoor antenna (or have somebody hold it) near that spot—either on the roof or high up on an outside wall—in a place free of obstructions. Connect coaxial cable to the outdoor antenna and then temporarily feed it inside the house through an open window or door. Then connect the cable to the amplifier and run cable from the amplifier to the indoor antenna. Next, plug in the signal amplifier and turn it on. Have a helper aim the outdoor antenna in the direction that gives you the best cell phone signal inside the house.

Once you've determined the best spot for all the components (be sure to check your installation manual for minimum distance requirements between the indoor and the outdoor antennas), fasten them down and run the coaxial cable. Fish the cable through a hole in an exterior wall, or use a special window entry cable (not shown), which is flat so you can install it through a closed window. For more tips on running and installing coaxial cable, search for "coaxial wiring" at [familyhandyman.com](http://familyhandyman.com).

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## Before you buy a booster, check for signal strength

The signal "bars" or "dots" on your cell phone are there only to give you a rough idea of signal strength. For more accuracy, set your phone to "field test mode," which gives you a numeric value (decibel reading) instead of bars. You'll need that number to check the strength of the signal outside your home because signal boosters require a minimum signal strength to work properly.

The weBoost system, for example, requires a minimum signal strength of -95db or stronger (the closer to zero, the stronger the signal). If the signal isn't strong enough, the booster won't work in your home. To find instructions online for enabling field test mode on various makes of cell phones, search for "field test mode."

SIGNAL  
STRENGTH

4:06 PM  
Friday  
13

-116 AT&T

Dropbox

Calculator

Calendar

Reminders

Notes

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## 3. VOICE OVER LTE

Some mobile network providers have been rolling out a technology called VoLTE, which allows you to make cell phone calls via a Wi-Fi router without a network extender or special app installed on your phone. One provider, Verizon, does not charge extra for the service—it's included with your monthly voice plan. VoLTE is new and developing fast, so we can't yet assess how well it performs in typical situations. One downside is that it works with only a few newer models of phones, and voice calls are still billed as standard voice minutes. Still, it's worth checking with your carrier to see if it offers VoLTE and whether you have a phone capable of "Wi-Fi calling."

## GET A BATTERY BACKUP

Both network extenders and signal boosters are useless if the power goes out, so a UPS (an uninterruptible power supply) battery backup (\$90 to \$150) is cheap insurance if you're living without a landline.

It'll power your Internet modem, network extender or booster amplifier for a few hours until the power comes back on. The backup battery shown is manufactured by Tripp Lite.





# CAR + garage

BY RICK MUSCOPLAT

[editors@thefamilyhandyman.com](mailto:editors@thefamilyhandyman.com)

## Upgrade your motorcycle safety gear

If you're like most other motorcycle riders, you look forward to getting out on the road at the first sign of spring. So you dust off your bike, fill it with fresh gas and fire it up. But you should also take a hard look at your safety gear. The truth is, your gear not only wears out but also gets outdated in terms of safety.

We talked to helmet, glove, boot and clothing gear manufacturers to get the scoop on the new gear as well as buying and usage advice. We won't kid you—the new gear is expensive. But if you're serious about being seen by other drivers and surviving a crash, the higher cost is worth it.





## DOT, ECE, SNELL and SHARP certifications

The more you learn about the tests done by the different certification organizations, the more confused you'll be. But it comes down to this: DOT and ECE certifications mean the helmet has met the minimum standards set by U.S. and European regulators. SNELL and SHARP are independent testing organizations that have developed tests they consider more rigorous. If you'll feel better knowing that your helmet meets either of those certifications, great. Otherwise, buy a helmet that fits your head and your budget and has the DOT or ECE certification.

# HELMET SMARTS

## Replace aged helmets

Helmets have a life expectancy of just five years or a single crash. We're not talking about incidents where your helmet gets dropped. But if your head was inside the helmet when it hit the ground, don't even think about using it again. The energy-absorbing foam materials simply aren't designed to withstand multiple impacts.

The foam materials deteriorate over time and begin to lose some of their impact resistance. Plus, the outer shell begins to weather from UV exposure. So check the date on the label and replace yours if it's at or near the five-year mark. Next, flex the shell slightly and check for cracks or deep gouges and examine the foam for cracks or degradation. Also check the visor for scratches. If you find any signs of damage, chuck it and buy a new helmet.

## Helmet shopping tips

Helmet prices run the gamut from under \$100 to \$1,500. At the low end, you're getting a helmet that meets the minimum safety standards from the Department of Transportation (DOT), as well as a few creature comfort features. At the high end, you get a much lighter helmet built from carbon fiber with extra impact protection and the ultimate in comfort.

When it comes to helmet safety certifications, some experts believe the DOT standards aren't strong enough and instead recommend buying a helmet that meets the more stringent ECE, SNELL or SHARP standards (see "DOT, ECE, SNELL and SHARP Certifications" at left). However, since a cheap, properly fitting helmet protects better than an ill-fitting helmet with "better" safety certifications, it's best to shop locally (rather than online or through catalogs) to get fit and product advice from knowledgeable sales clerks.

In addition to buying a helmet best suited to your type of riding (touring, racing, off-road), here are some other buying tips from the experts:

- Full-face helmets with a face shield and fixed chin guard provide the best protection in a crash.
- Open-face helmets offer better visibility and more ventilation but less impact protection.
- Half helmets provide maximum ventilation and visibility but offer only marginal protection. They're better than riding with no helmet, but not by much.
- Modular helmets allow you to flip up the chin bar to refuel or eat Twinkies without removing your helmet. They're safer than an open-face helmet but not as safe as a full-face design.
- Novelty helmets that aren't DOT certified might allow you to meet the letter of the helmet laws in your state. But they provide little protection—you might as well strap a salad bowl to your head.



The **BELL Qualifier DLX** street helmet is a few steps up from an entry-level helmet but provides a lot of bang for the extra bucks. At \$250, this full-face helmet includes a photochromic face shield with anti-scratch, antifog and UV coatings, adjustable ventilation, a padded wind collar to reduce wind and road noise, and speaker pockets so you can add a Bluetooth headset and intercom. DOT certified.



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# GET SEEN WITH BRIGHTER GEAR

Motorcycles are notoriously overlooked by inattentive drivers, but you can dramatically increase your survival prospects by wearing higher-visibility clothing.

The **GlowRider Electro-Luminescent Motorcycle Jacket** from **Adaptiv Technologies** (in black or yellow; \$300 from [adaptivtechnologies.com](http://adaptivtechnologies.com)) has flexible, flashing blue panels sewn into the back and shoulder areas to get you noticed. The flashing panels are powered by a rechargeable lithium battery (included). In addition to the lights, the jacket features back protection and armor at the elbows and shoulders. The outer shell is waterproof and abrasion resistant and includes air vents at the chest, sleeves, upper and lower back, as well as a zip-out quilt liner.



ADAPTIV TECHNOLOGIES

These **REV'IT! Stellar leather/polyamide motorcycle gloves** (\$200 at [revzilla.com](http://revzilla.com) and other retailers) provide visibility and exceptional hand protection. Dual-composition honeycomb thermoplastic polyurethane (TPU) and a high-impact aluminum shield protect your knuckles. The gloves also include a hard-shell little-finger protector, a palm slider and impact-resistant foam for index fingers. They're available in black with white, red or green accents, or in white leather with a red accent.



TCX

The **TCX X-Street shoe** isn't a high-visibility boot. However, it's perfect for riders who want protection but don't want to lug around a second pair of shoes for street use. The TCX X-Street waterproof shoes (\$150 at [motorcycle-superstore.com](http://motorcycle-superstore.com) and other retailers) look like sneakers but include ankle protection and a reinforced toe and heel.



PROTEKT

**Protekt Khaki Pants** (\$127 at [aerostich.com](http://aerostich.com)) offer protection and comfort. Just unzip the knee zippers, slide in some Transit Impact Armor knee guards (\$22 each), and ride off to work or play. Then remove the guards and enjoy the rest of the day without changing clothes. The 100 percent cotton twill khaki pants have a triple-layer knee and seat area that includes a hidden 500D Cordura middle layer for abrasion resistance and an inner cotton liner for comfort.



AEROSTICH

The **R-3 riding suit** (\$1,127 at [aerostich.com](http://aerostich.com)) lets you ride in comfort, be seen by other drivers and be protected. Just slip it over your street clothes. The R-3 is waterproof and unlined. For protection, it's built with a double layer of 500D Cordura GORE-TEX fabric across the seat and added 1000D abrasion-resistant layers covering the elbow/shoulder/knee areas. Underneath the layers is energy-absorbing removable oversized TF Impact Armor. Optional hip, spine and chest armor increase the R-3's capabilities. The R-3 is available in six colors.



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# PRO tips

BY MARK PETERSEN

editors@thefamilyhandyman.com

## Avoid trailer disasters



GETTY IMAGES/BRIAN STABLYK

Hauling trailers can be dangerous, but for many people in the trades it's a necessary evil. We talked to an expert who's been in the trailer business for most of his life. He gave us some commonsense maintenance tips, great gear suggestions and terrific hauling techniques, all of which should help you keep your trailer on the road and your load on the trailer. He even shared his pretrip checklist.

### MEET THE EXPERT

Pat Tietjen knows trailers. He's one of four brothers who run Ace Trailer sales, a business started by their dad in 1984. Ace has two locations in Minnesota, one in Shakopee and the other in Hastings.



### Grease the bearings

When asked the No. 1 cause of trailer breakdowns and accidents, without hesitating, Tietjen said, "Bearings. People don't maintain their bearings." Over time, bearing grease breaks down and loses its ability to lubricate and dissipate heat. Many manufacturers recommend repacking wheel bearings in grease every year or 10,000 miles, whichever comes first. Undermaintained bearings can overheat, eventually causing them to seize, start on fire or separate completely so that the wheel falls off while you're driving...not good!

Our expert is not a fan of bearing caps with a built-in grease fitting. Adding grease through the cap can permanently damage the rear seal. Plus, this method fills the axle/spindle area with grease, which should remain dry. And removing the old grease and cleaning the bearing are vital components of repacking bearings, one that is often neglected when people rely on these caps. For more information, search "bearings" at [familyhandyman.com](http://familyhandyman.com).

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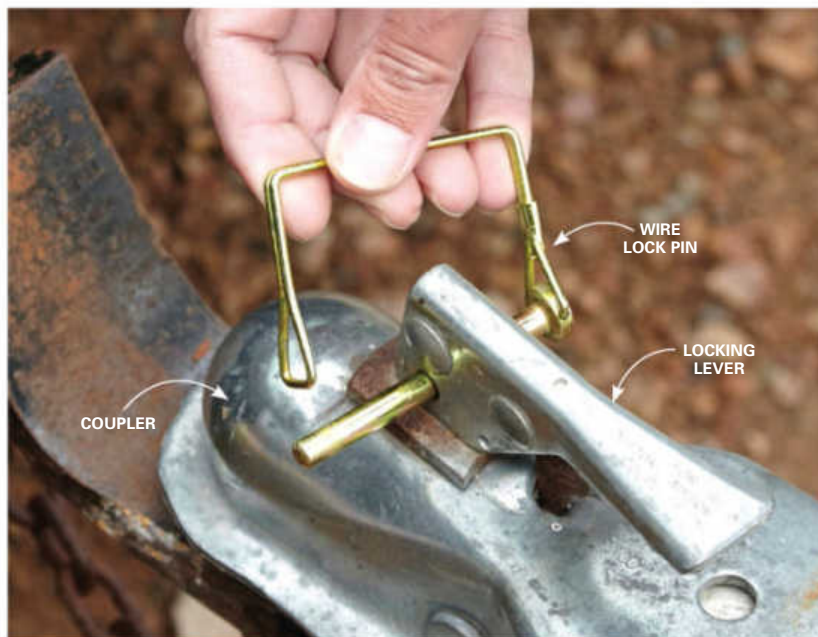
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## Always pin the coupler

The second most common trailer disaster is caused by a trailer coupler coming loose from a ball mount. Hooking up a trailer to an undersize ball is the usual culprit... don't do that!

A loose locking lever is another common cause of losing a trailer. As the trailer bounces down the road, the locking lever can wriggle up into the unlocked position. A pin will keep that from happening. The wire lock pin shown here costs about \$4 at home centers, so there's no excuse for not using one.



## A trailer should ride level when loaded

Trailers are designed to ride level. A trailer that's high or low on one end or the other won't pull as smoothly, or as safely. Also, hauling a tandem axle trailer unevenly will cause more wear and tear on one set of tires and suspension than on the other.

The "drop" of the ball mount determines how high or low the tongue of the trailer will ride. Here's one way to estimate the amount of drop your ball mount needs: Measure up from level ground to the top of the receiver, then measure up from the ground to the bottom of the coupler on the trailer; subtract the first measurement from the second. But that will only get you close.

The problem with this method is that it doesn't take into account the tongue weight of your particular trailer or the stiffness of your truck's rear suspension. The only true way to get your trailer to ride level is to hook it up to your truck, fully loaded, using a ball mount you think has the proper drop. If the trailer is level, great; if not, adjust accordingly. A good trailer dealer should have extra mounts you can play with.





## Inspect your coupler

The friction from the coupler pressing down and twisting on the ball will wear down a coupler, causing the metal to get thin. Inspect the coupler periodically and if you find even one hairline crack, replace it immediately. Some couplers are bolted on, but some need to be cut off and the new one welded on. Greasing the ball might reduce the wear a little bit, but it's not worth the mess. If you're shopping for a trailer and you know you're going to put tons of miles on it, buy one with a cast tongue rather than stamped metal; they're thicker and last longer.



## Cross the safety chains

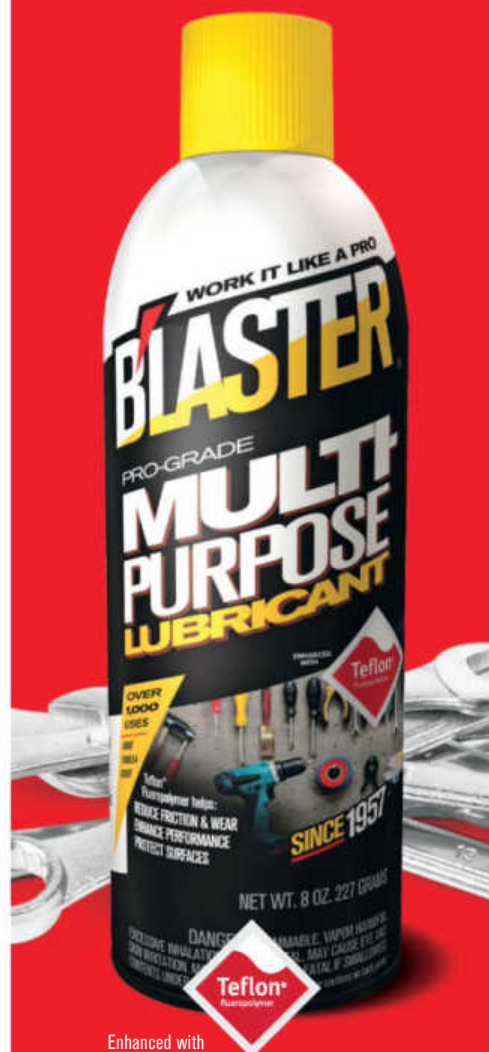
Crossing the safety chains creates a cradle that the coupler can fall into and will reduce the distance the trailer will swing side to side if it uncouples (shudder!). Crossing chains also keeps them up a little higher so they won't drag on the road and wear down. Strong chains provide better protection for your trailer and the folks on the road around you. If your chains still drag after crossing them, cross them over each other a couple times or shorten them.



## Make your own ramp

Flat tire? Forget your jack? If you own a trailer with tandem axles, you could build your own ramp out of scraps of wood. Or you could simply roll up onto a street curb if one's handy. It's best to unload the trailer beforehand if at all possible.

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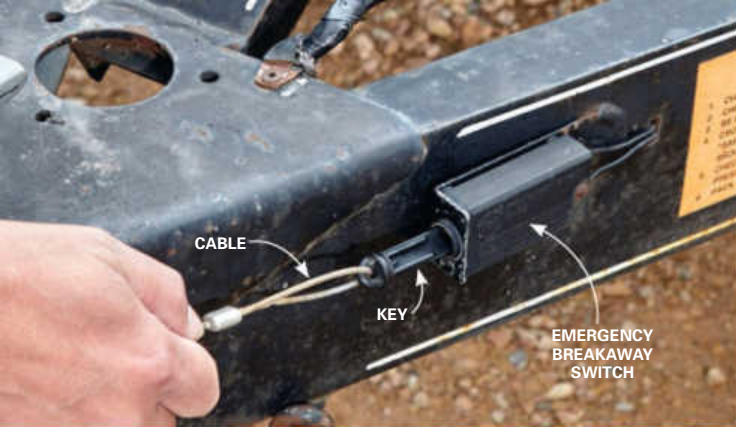
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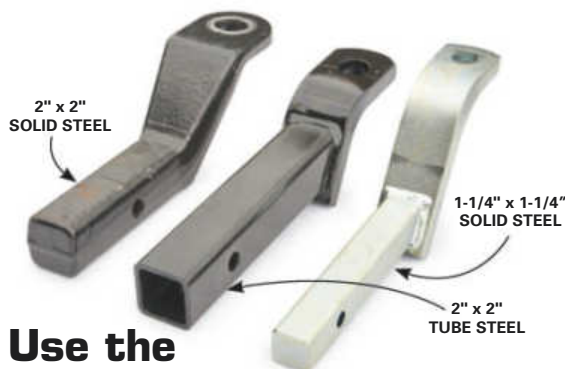




## Test your emergency brake

Most states require electric brakes on large trailers, and many require a backup emergency braking system that activates if the trailer is separated from the tow vehicle. The most common type of emergency braking system consists of a cable attached to a key, which fits into a breakaway switch that's powered by a dedicated battery. The other end of the cable is attached to the truck. In case of separation, the key would be pulled out of the breakaway switch, which would send an electric charge provided by the battery to activate the brakes.

Checking the emergency brake system is simple enough. Hook up the trailer, pull the key from the switch, and pull the trailer forward. The wheels shouldn't roll if the system is working properly. If the brakes don't engage, you could have a bad switch or faulty wiring, but a dead battery is the usual culprit. Breakaway batteries receive a charge every time you hook up your wiring harness, but they should still be replaced every couple of years.



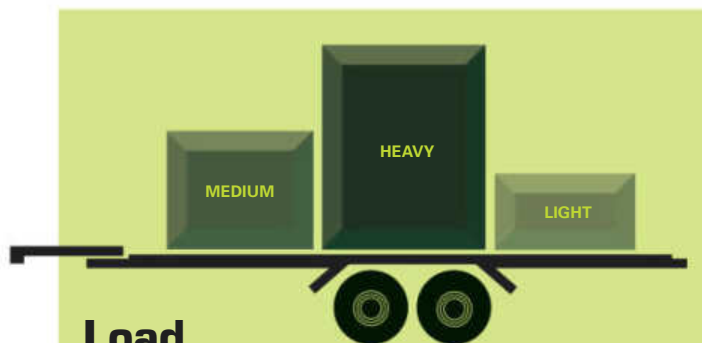
## Use the proper size ball mount

Not all ball mounts are created equal. Make sure the ball mount you're using can handle the weight of your trailer and its load. Exact specs can vary, but here are some common ones:

- 1-1/4 x 1-1/4-in. solid steel—1,000 to 3,500 lbs.
- 2 x 2-in. tube steel—up to 7,000 lbs.
- 2 x 2-in. solid steel—up to 16,000 lbs.

## Only use trailer tires

Installing car or truck tires on a trailer is a bad idea. Trailer tires (ST for "Special Trailer") and light truck tires (LT) or other passenger vehicle tires are not built the same. The sidewalls on truck tires have more flex, which improves traction and makes for a more comfortable ride. The sidewalls on trailer tires are stiffer. Stiffer sidewalls increase the amount of weight a tire can handle and reduce the risk that a trailer will sway.



## Load

Tongue weight is the force that the tongue of the trailer exerts on the back of the truck. Proper tongue weight should be 10 to 15 percent of the combined weight of the trailer and its load. So a 2,000-lb. trailer with a 3,000-lb. load should have a tongue weight of 500 to 750 lbs. The proper way to load a trailer is to keep the bulk of the load over the trailer tires, with a little more weight toward the front.

Too much tongue weight is hard on the truck's suspension and takes weight off the front tires. This makes the truck unwieldy on curves and reduces stopping distance. Too little tongue weight will cause the trailer to sway back and forth and possibly fishtail out of control.

Unless you have a super-fancy ball mount that has a built-in scale (about \$300), you'll have to judge the tongue weight by how much the back of your truck drops down when the trailer is attached. The next time you have a few buddies over, have them climb onto the bumper of your truck. Measure and take note of how much the rear of the truck drops with the added weight.



## Keep a good jack on hand

Storing a spare trailer tire on board is a no-brainer, but what about the jack? Some trucks have jacks that may not be able to handle a loaded trailer, or they may have a strange configuration that might not work safely on a trailer. Try out your truck jack on your trailer; if it doesn't work, buy a dedicated trailer jack. The one shown above is a combination jack and jack stand made by Powerbuilt. It costs \$40 at Tractor Supply.





## Use the proper size ball shank

The proper size of the ball is not the only thing to consider when buying a ball for your trailer; the size of the ball shank is crucial. The size of the shank determines how much weight the ball can handle. Shank capacities vary, but here are some common specs:

- 3/4-in. shank—up to 3,500 lbs.
- 1-in. shank—up to 7,500 lbs.
- 1-1/4-in. shank—more than 7,500 lbs.

## PRETRIP CHECKLIST

You owe it to the other drivers you'll be sharing the road with to make sure your trailer is road-worthy every time you take it out. Check the following items before taking to the streets:

- The ball and the coupler are compatible sizes.
- Chains, wiring harness and breakaway cable are all connected.
- Ball mount pin is in place.
- Locking lever is down and pin installed.
- Ball is fastened securely to the ball mount.
- Tongue jack is raised.
- Tires are properly inflated and lug nuts are tight.
- Lights are all working.
- Ramps and/or gates are in place and secure.
- Load is fastened and secure.
- Brakes are working.

## Double-check the load

Even loads that have been properly secured with the appropriate chains or straps can come loose after getting jostled on a bouncy trailer. It's a good idea to stop after driving a short distance, to inspect the load to make sure it's still secure. And then every time you make a stop, for gas or whatever, check it again. You can't be too careful.

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# What homeowners **MUST** know

BY GARY WENTZ

[editors@thefamilyhandyman.com](mailto:editors@thefamilyhandyman.com)



## HANG LADDERS LOW

Most people hang ladders high on the wall. But often, lower is better. It makes ladders easier to grab and, since ladders are skinny, leaves floor space open for parking cars, bikes or the mower.



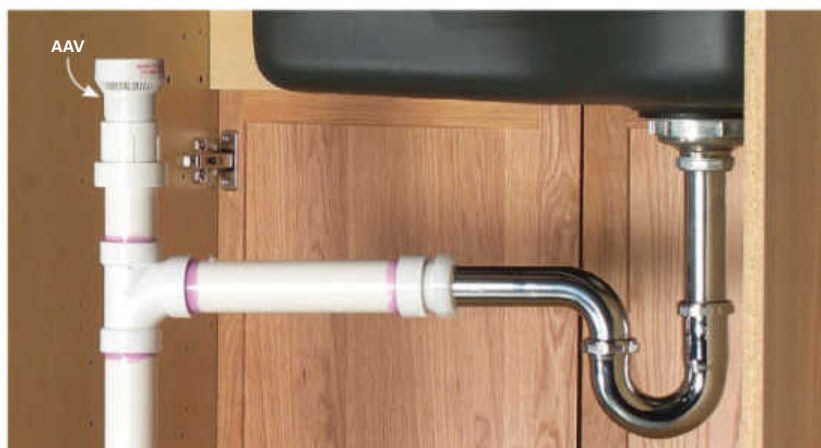
HINGE

## Make mowing easier

Flip-up downspout extensions won't slow you down while mowing. You can lift them out of your path with your foot. You'll find downspout hinges at some home centers and online. Installation is as easy as driving a few screws, though you may also have to cut the extension at a 45-degree angle.

## Enzymes really work on pet stains

Cleaners that contain enzymes aren't like other products. Their key ingredient is harmless bacteria that eat the organic matter that causes stains and odors. Just spray it on. When the organic matter is gone, so are the stains and smells. And having eaten all their food, the bacteria die.



## An air admittance valve can save time and money

An air admittance valve (AAV) lets air into the waste system but not out of it, so it can take the place of a vent pipe running up through the roof. On remodeling projects, that can save the plumber a lot of work—and you a lot of money—if it's allowed by your local code. AAVs aren't allowed in some situations.



ART DIRECTION MARY SCHWENDER • PHOTOGRAPHY HSP





## Clean fridge gaskets

If you keep your refrigerator door gaskets clean, they'll seal properly and last the life of the fridge or freezer. But if you let sticky foods like syrup and jam build up on the door gasket, they'll glue the gasket to the frame. Pulling harder on a stuck door eventually tears the gasket, and that'll cost you \$100 or more. Plus, if the door doesn't seal properly, the fridge has to run longer, and that'll boost your electric bill. Clean the door gasket with warm water and a sponge. Don't use detergents; they can damage the gasket.

## Beware of lubricant overspray

When using household lubricants, do your best to keep them off surrounding surfaces. Some contain solvents that will harm paint, flooring or plastics. And painters tell us that residue (especially silicone and Teflon) can hang around for years, causing adhesion problems the next time you paint.



## USE YOUR BATH FAN!

Your bath fan expels odors and keeps the mirror from fogging up. But it also does something far more important: It gets rid of excess humidity after a bath or shower. In winter, high indoor humidity causes condensation on windows, which stains or damages window sashes and sills. In summer, high humidity makes your A/C system work harder, which drives up your electric bill. Worst of all, humidity can enter walls, causing mold, rot and peeling exterior paint. So run your fan for 15 to 30 minutes after your

shower. A timer switch makes that easy. Better yet, install a humidistat switch that will automatically turn on the fan when humidity rises. For more information, search for "DewStop" at [familyhandyman.com](http://familyhandyman.com).



## Test wood finishes first

In just 30 minutes, I once ruined a bookcase that took me 65 hours to build. The stain went on blotchy and the color was nothing like I expected. Sanding off the bad stain took another six hours! Every woodworker I know has a similar story. You just can't rely on the stain samples in stores. Actual color varies a lot, depending on the wood type and how you prepare it for finishing. Now I always do tests. Sometimes I mix stains to get the color I want.

**David Radtke, Contributing Editor**



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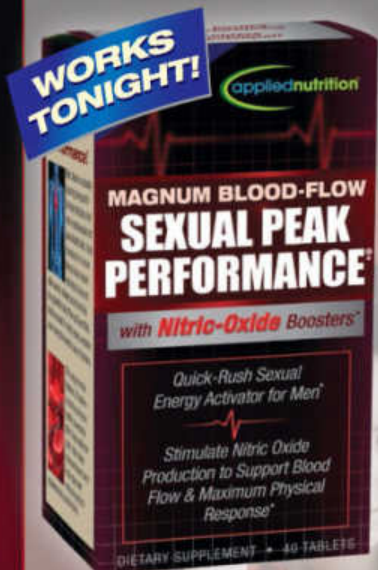
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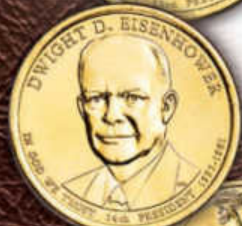
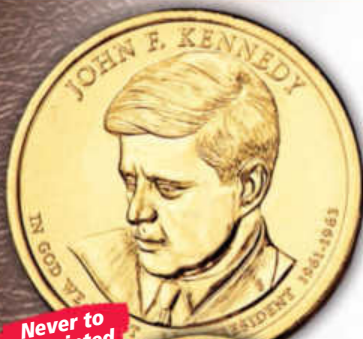
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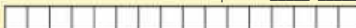
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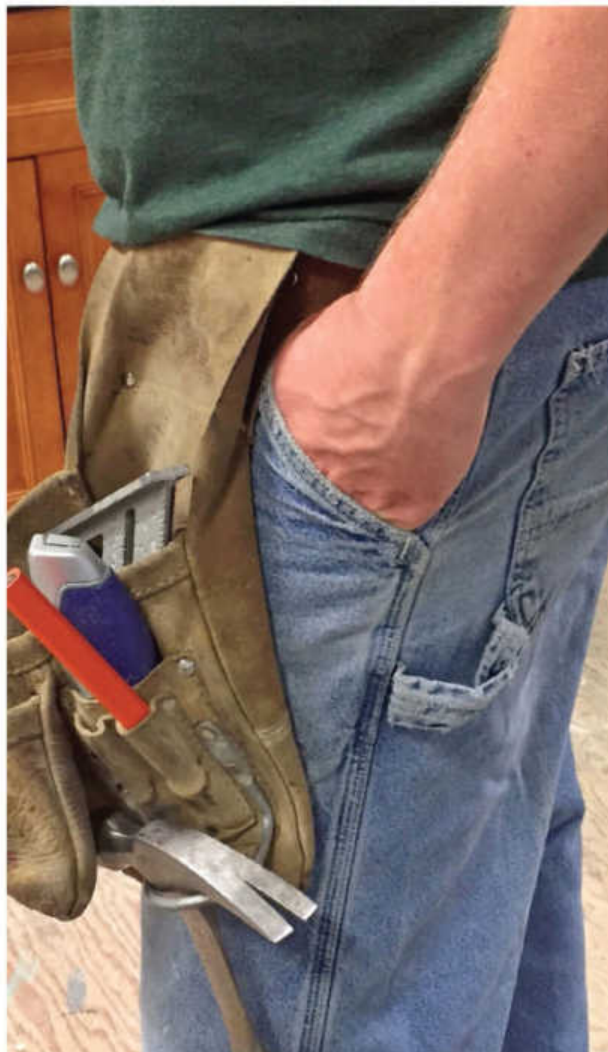


# PRO talk

BY MARK PETERSEN

editors@thefamilyhandyman.com

ART DIRECTION MARCIA ROEPKE • PHOTOGRAPHY HSP UNLESS NOTED



## SLANTED POCKETS FOR EASY ACCESS

Wearing a tool belt makes it hard to reach your pants pockets. And it's a pain to undo your belt every time you need to grab your truck keys. Several years ago, I discovered that some of the pants and shorts I wore had slanted pockets, which allowed me to reach in under my pouch to get at my keys. Now I only buy pants with slanted pockets. I typically get either Carhartt or Duluth Trading brands, but there may be others as well.

**Josh Risberg, TFH Lead Carpenter**

## Got something for us?

If you've got a tip, a brag photo or a project you'd like to share with fellow pros, send it to us at [editors@thefamilyhandyman.com](mailto:editors@thefamilyhandyman.com). We'll send you a \$100 gift card for each one we publish.



## A smart solution for securing loads

As someone in the forest management industry, I frequently navigate pretty rough trails. If I don't tie down everything that I carry in the back of my truck, it will eventually be destroyed or bounce right out. Like most other trucks, mine has tie-down anchors at the front and back of the bed, but there's nothing to hook onto in between. My solution was to run a length of chain from the front anchor to the back one. Now I can hook my bungee cords and ratchet straps wherever I need them. I can hit the trails hard with no worries except spilling my coffee.

**Carl Campbell**



## Glove swap

I always bought jersey gloves for my crew and me. They were light, easy to pull off and on, and super cheap. I bought them by the dozen. The problem was, as a lefty, my right glove always wore out faster than my left. All the righties on my crew had the opposite problem. So instead of throwing out both of my gloves, I would swap my slightly used left-handed gloves for their right ones. We got twice the mileage from each pair. But I'd never swap with the smokers—couldn't stand the smell!

**Jeff Gorton, Associate Editor**

# Great GOOFS®

FROM OUR READERS

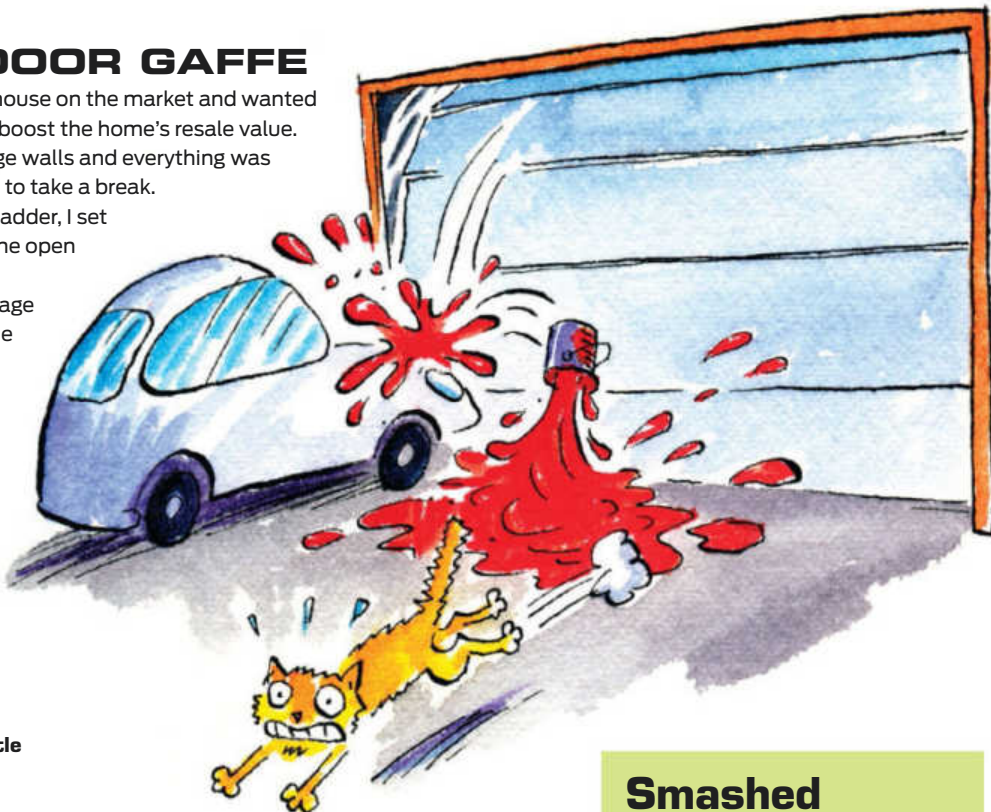
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## GARAGE DOOR GAFFE

We were about to put our house on the market and wanted to spruce up the garage to boost the home's resale value. We were painting the garage walls and everything was going fine until we decided to take a break. Before climbing down the ladder, I set my can of paint on top of the open garage door.

Out of habit, I hit the garage door opener as I entered the house, which caused the paint can to fall on the driveway. Paint splattered all over the car, the garage door, the driveway and everything else within the "splash zone." We spent two hours scrubbing and washing off all the paint. It was quite a while before I attempted painting again.

**Gary Scheidemantle**



## Insulation conflagration

While paneling his basement, my neighbor drove a nail into a copper water pipe. No big deal. He just turned off the water, cut the pipe and slipped on a repair coupling. But while soldering, he set the insulation's paper facing on fire. As the small fire grew, he ran for the garden hose and his wife called 911. Only after dragging the hose into the basement did he remember that the water supply was off. Luckily, there was a fire extinguisher handy, and he finished off the flames just as a fire truck arrived.

**George Impellizeri**



## Smashed

My wife and I had just bought the house next door. It had gleaming terrazzo floors, which are both beautiful and rock hard. We were in the middle of moving some furniture around and had taken the large, round glass top off our dining room table and leaned it against a wall. I guess I didn't realize how slippery the terrazzo floors were, because all of a sudden the tabletop started sliding and hit the floor, sending a million shards of glass flying in all directions. We're lucky nobody got seriously hurt, but replacing that tabletop sure was a pain in my wallet.

**Jim Barteld**

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